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West Europe Report

SCIENCE AND TECHNOLOGY

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AEROSPACE

EFFECTS OF U.S. SHUTTLE PROBLEMS ON HERMES, ARIANE

New Insights to Benefit Hermes

Madrid YA in Spanish 30 Jan 86 p 40

[Excerpts] Paris--The Challenger disaster has made headlines in all the French newspapers, and there have been countless expressions of sympathy and dismay over what LE MONDE yesterday described as "an American tragedy." The messages have come from the prime minister, Communist leaders and the rest of the French political class.

The Challenger tragedy of course raises the problem of safety in space flight and, in a sense, could affect the plans for the "European spaceplane" Hermes. Emotions were still running high yesterday in French scientific and aerospace circles, but the pessimism that the shuttle disaster might have prompted was followed by feelings of confidence and the conviction that failures and even personal tragedies are part of the conquest of space.

The European Space Agency (ESA) indicated yesterday that "it still had complete confidence in the American space shuttle program and was convinced of the need for it." In a press release yesterday, the ESA said that "manned space flights are essential to the conquest of space." After expressing its profound sadness over the tragedy, the agency reaffirmed its desire to cooperate with NASA, whose projects the Europeans will continue to make use of.

The same sentiments were voiced yesterday by Hubert Curien, the minister of research and technology, in discussing the Hermes project. Curien, who is the father of the Ariane rocket, stated that the French would bear the conclusions of the U.S. investigation in mind but would continue their work on Hermes, and he emphasized that absolute safety is unattainable.

Misgivings in Bonn

In addition, Andre Lacaze, the technical director of the Hermes program at Aerospatiale, indicated that "the investigation of the Challenger accident would mean the introduction of additional safety measures." Meanwhile, Bernard Deloffre, the program manager in the same company, noted that the

accident would have no impact on the work schedule. The Hermes is supposed to make its first flight in 1995.

The project, which is faced with financing problems in Germany, is in the study phase and could thus incorporate any new safety features that are deemed necessary.

Bernard Deloffre indicated that the most dangerous time for both the Hermes and the U.S. space shuttle is the first few minutes of flight, the priority being to separate the spacecraft from the booster rockets as quickly as possible. This operation will be easier for the Hermes than it was for the Challenger, inasmuch as the European orbital spacecraft will be launched by the Ariane rocket, from which it can separate more readily in the event something goes wrong.

The assistant general manager of the CNES [National Center for Space Studies], Jean-Marie Luton, indicated that that the "safety" options for the Hermes and for its crew (between two and six persons) have not been decided on yet. One of the possibilities is "ejection of the astronauts and of the command module during the first few minutes of flight." Hermes might be outfitted with an engine that would enable it to separate from the Ariane in the event of a problem.

Moving Ahead with the Ariane

In any event, once the initial shock of the Challenger disaster had come and gone, French aerospace circles expressed their confidence in the future of space flight. NASA's experiences could be taken advantage of in the Hermes program. The fact is that the program seems threatened more by the Bonn government's lack of enthusiasm than by the "American tragedy" of Challenger.

Increase in Ariane Orders Expected

Madrid CINCO DIAS in Spanish 31 Jan 86 p 18

[Text] The European Space Agency and many other organizations, governments and well-known figures have expressed their condolences over the loss of Challenger. Aerospace executives feel, however, that a major delay in the American program will help Europe's program by securing it more contracts and greater governmental support.

European officials speculate that if there is a long delay in launches of the American space shuttle, orders will shift to the Ariane, which is also recovering from a failed launch, its 15th, last September.

The accident could also prompt broader political support in Europe for greater aerospace autonomy. Thus, France's Hermes spaceplane program could receive a major boost. In addition, British Aerospace's HOTOL project, which is currently in the preliminary studies phase, will have a better chance of success.

The requests for room on the Ariane are currently enough to fill some 20 launches up to 1988. Since it is less complex than the American shuttle, not as many things can go wrong. Moreover, its performance in placing satellites in preset orbits has been better than the American space shuttle's.

The European rocket has captured about 40 percent of the market for launching communications satellites and, with the suspension of U.S. flights, could grab an even larger share of this juicy market.

High-ranking French officials estimate that the development costs of the Hermes program will come to about $1.5 billion, although some of their French colleagues doubt that this figure can be met. The French paper LES ECHOS commented that the accident could heighten the fears of potential partners in the European spaceplane program and that the safety measures that will be developed as a result of this accident would boost costs.

Besides the Hermes, the Europeans have approved development of a new booster rocket, which will be dubbed the "Ariane V." This rocket will place heavy payloads in orbit as of the mid-1990's; one of them is the Hermes spaceplane. The Ariane V program will cost Europe some $2.6 billion.

The secretary of the Spanish Astronautical Association, Alvaro de Azcarraga, explained that the disaster would delay some of NASA's scheduled flights in cooperation with Europe, in which Spain is involved. Among the programs is the "Ulysses" space probe, which will study the sun's polar caps; it will be delayed more than a year. A Spanish firm was commissioned to build the mechanical flight system, which activates the movable parts of the spacecraft.

There will also be delays in launching the space telescope, one-quarter of which Europe is financing, and some later flights on which Spacelab was scheduled to be assembled may also be postponed.

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AEROSPACE

FIAR'S CURRENT EFFORTS IN AVIONICS SUMMARIZED

Madrid DEFENSA in Spanish December 1985 pp 10-12

[Article by Patricio Panafa]

[Text] FIAR [Italian Radioelectric Equipment Factory] is one of the largest military electronics companies in Italy. In that capacity, it is helping to strengthen Italy's diversified defense industry.

FIAR, which is located in Milan, employs over 1,000 highly skilled people. Its defense division (one of the three into which the firm is divided--the other two are space and robotics/industrial automation) is actively involved in the field of avionics, optoelectronics, and heavy military systems; the latter field includes ground radars, air defense systems, mine classification equipment, etc.

In avionics, after developing fire guidance control radars for the F-104 G and F-104 S used by the Italian Air Force, FIAR developed its Setter radar, designed for the modernized F-104 S-ASA. It has also been active in the consortium producing the radar systems for the Tornado aircraft.

After these projects, FIAR began two research and production programs for high-tech fire control radars for combat aircraft, using two different approaches: in one project, it is handling development itself, and in the other, it is working in cooperation with a giant in the industry, the U.S. firm, Westinghouse.

The GRIFO Radar System

FIAR's own product is named GRIFO [griffon]. This is a multi-function radar for airborne combat missions for small aircraft.

Now in an advanced developmental phase, the GRIFO radar will have a search and tracking capability in both "look up" and "look down" modes.

With its modular design, this radar can be carried on numerous types of tactical missions and on board armed training aircraft, thus considerably boosting their potential.

Operating in I band (formerly X band), this is a doppler radar with totally coherent pulses. It uses a 60-cm plane antenna with a 200 MHz bandwidth. This enables it to vary frequencies and pulse compression easily.

The GRIFO operates in low and medium PRF [Pulse-Repetition Frequency] modes: the first provides a good time discrimination, and the second gives the best doppler/range discrimination relation. The doppler filtering is done by a signal processor that uses FFT [Fast Fourier Transforms].

The system has five components: the antenna, transmitter, receiver, signal processor, and computer. Its deisgn incorporates the latest technologies and made a widespread use of CAD [Computer Aided Design] methods.

When a scan converter is used, the system becomes capable of generating symbols superimposed on a video image for on-screen, TV-style presentation, and it can be integrated with the on-board avionics by means of an MIL-STD-1553B data bus.

The GRIFO was originally proposed for a version of the Italian-Brazilian AMX, and the HAWK 200 made by British Aerospace, and it could be installed as a retrofit system in other aircraft, such as the MIG-21, Douglas A-4 Skyhawk, or various types of Mirage aircraft.

The ALTAIR [Advanced Light Tactical Airborne Radar] will be produced in collaboration with Westinghouse. As its name suggests, this is a light radar designed for use on board the AV-8B Harrier II developed by the Spanish Navy and the U.S. Marine Corps. For this system, the experience of both companies will be used in the design and production of doppler pulsed radars for combat aircraft.

Moreover, I will add that FIAR is one of the group of companies planning to develop the fire control radar for the future European Combat Aircraft, in which the most advanced technologies in this field will be used. This will be light, high performance equipment. The system may have a range of about 100 kilometers, with a 1-meter antenna and an 8-kw transmitter.

Optoelectronics

FIAR has extensive experience with the production of optoelectronic equipment, which is used both in Italian Navy ships and by those countries to which these systems have been exported.

This equipment includes day and night TV cameras, IR [infrared] thermographic cameras, laser telemetry, TV trackers, monochromatic and multichromatic display screens, and simulation and training equipment.

This equipment is very useful in naval and anti-aircraft fire guidance control systems and for combat tanks. The FIAR equipment is known for its

solid construction, adaptability, and advanced technology. One good example is the Sprite detector.

Another example is the thermographic camera used for naval applications, the P4674 TINA, which works in an 8 x 12 micron window, with a detection range of about 18 kilometers for plane-sized targets, and 13 kilometers for helicopters.

The camera has two fields of vision: wide (4 x 2,6°) and narrow (2 x 1.3°). It is used for tracking in firing directions.

The video output, in a standardized CCIR [International Radio Consultative Committee] format, may be superimposed with an adaptable reticle generated electronically; it has an electronic zoom, automatic local control of the dynamic margin, and generation of 64 gray levels.

It weighs 30 kilograms and operates on 28 V.d.c. [Voltage Direct Current] with a power consumption of 8 A.

The TINA camera is used along with other FIAR optoelectronic sensors in optoelectronic control devices produced by some of Italy's most important industries. The other sensors are: the daytime camera PUMA; the LLLTV [Low Light Level TV] camera, the P4361; and the laser telemeters, P0700 and P0701.

The P4361 nighttime camera has light intensification equipment, for use either during the day or at night, by means of an automatic filter with neutral density. It is designed to operate in poor weather conditions and can be remotely controlled.

The P0700 telemeter is high power equipment which, along with the PUMA camera, is used in optoelectronic controls of frigates of the "Maestrale" class of the MMI [Italian Navy].

This is a telemeter with higher power than others of its class: over 20 MW, with pulses of 8 to 10 ns in duration, with a maximum of 15 pps.

The P0701 telemeter, like the P0700, also uses a yagi-neodymium transmitter, which transmits on 1.064 microns; however, this unit is lighter, and it is contained in a single unit weighing 20 kilograms. It transmits with a power of 10 MW at a variable rate on 1, 5, 10, or 20 Hz, which can be remotely controlled.

The receiver consists of an optical silicon avalanche photodiode measuring 12 cm, reaching a measurement level of up to 20 kilometers for targets of the size of a transport aircraft.

The unit includes the laser transmitter, the receiver, the cooling system (which operates by forced liquid circulation), the signal processing electronics, the optics, and power source.

For its modular integration in any system--ground, naval, or airborne--the P0701 has a series communications channel.

Optical Trackers

Still in the field of optoelectronics, FIAR produces two systems for controlling fire guidance platforms: these are two TV trackers, which operate according to two different principles: by contrast (P4700) or by correlation (P4690).

The TV tracker is an electronic unit that accepts a video signal from either a day or night TV scan camera, and continues tracking the target in the center of the image: to do this, it generates error signals that act on the orientation servomechanisms (bearing and elevation) of the platform supporting the camera.

This is an autonomous unit that can be connected to any camera and any platform, so it may be considered a black box, which receives a video signal input, and then generates error output signals (analog or digital DC).

The P4700 is a contrast tracker which operates in either on board or centroid modes. It uses a gate of variable dimensions which adjusts automatically to the target's dimensions. It can maintain tracking of targets of dimensions of 2 ns in bearing (horizontal dimension of the raster [pattern of horizontal scan lines on screen when no signal is present] and two lines in elevation.

The P4690 uses the mathematical principle of correlation, comparing successive samples of the image to obtain predictions of future position, adjustment, and trajectory. The system performs a digital conversion of the scene. The P4690 really uses two channels, one for correlation and the other for contrast, which ensures optimum operation in different circumstances, depending on the conditions present. The system switches automatically from one to the other channel, or can work with one combined channel.

The prediction algorithm enables tracking to be maintained even when the target is temporarily concealed.

The P4690 generates a video output identical to its input, but superimposed with an adaptable reticle and alphanumerical symbols, all of which are generated electronically.

The error signal outputs are digital, transmitted by a two-wire series channel at 19,200 bauds.

The systems which we have just described, both radar and optoelectronic, are a sample of what FIAR offers in the field of defense electronics. This company stands out because of its balance between diversification and specialization.

The importance of this firm, which also works in the advanced and complex field of satellite communications and space technology, is undeniable. One proof of this statement is the dissemination of its products on all levels: from complete finished systems to subsystems and devices.

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AEROSPACE

HERMES, SHUTTLE REFLECT DIFFERENT ESA, NASA STRATEGIES

Rome SCIENZA DUEMILA in Italian No 1, Jan 86 pp 82-86

[Article by Lorenzo Pinna: "Hermes in Space"]

[Text] The orbital flight system studied by the French, less powerful but more versatile than the American shuttle, will enable united Europe--in the next 10 years--to carry human beings into space and to build a permanent space station. The first flight with astronauts is scheduled for 1996.

At present, the European space shuttle is only a French initiative. Last October CNES, the National Center for Space Studies, gave the order for the construction of the Hermes shuttle to "Aerospatiale" and "Marcel Dassault." The two French aerospace firms will build both the shuttle itself and the launching, landing, astronaut training and preparation, and mission ground control equipment. Even though Hermes is for the moment just a French business, CNES feels confident that during the next ESA meeting [to be held in the first months of 1986] the program will be included within the ESA [European Space Agency] projects and that the industries of other countries will take part in its construction. These hopes are well founded as ESA already approved [during the Rome meeting held on 31 January, 1985] the Ariane V and Columbus space station projects. By also approving the Hermes project, ESA will create the conditions for European space autonomy in the year 2000.

In 1992-1995 the Columbus station will go alongside the American one after being carried into orbit by the space shuttle. However, in subsequent years it will be directly launched by Ariane V, for which final tests are scheduled in 1995.

To become self-sufficient, what is missing is only a means of transport similar to the American shuttle: The Hermes project meets this requirement.

Two Different Philosophies

The European shuttle characteristics show ESA's and CNES' different strategy from that of NASA and the American shuttle. In fact, CNES considers it more convenient to have a powerful rocket able to carry into orbit various payloads rather than a shuttle, like the American one, which is able to become an orbiting and launching platform. In accordance with this philosophy, Ariane V

has been designed to carry satellites [up to three each time], Columbus modules, and the Hermes shuttle. The American shuttle now carries satellites inside its large hold and will later carry the space station modules. CNES assumes that running costs will be reduced by Hermes, as the complex safety measures necessary for manned lift will not always be necessary. Satellites and modules will be launched by more economical automatic systems. In contrast, the American shuttle always makes the presences of humans on board necessary.

CNES' different strategy pushed designers to think about a shuttle quite different from the American one. Hermes still has some similar characteristics, such as delta wings, glider-like landing, and the possibility of being reused, but it is very much different from its bigger brother.

First, let's consider their dimensions. Since Hermes has not been built to carry huge satellites or station modules, it is much smaller than the American shuttle. If the space shuttle may be compared with a DC 9, Hermes will be more simialr to a military fighter. The European shuttle will, in fact, have the following dimensions: 16 m long, 10 m wingspan, 35 cubic meter hold volume, 3 m max diameter, and 9 tons empty weight. Its crew will number four to six astronauts, their missions will last 3 to 4 weeks, and its payload will not exceed 4.5 tons [the shuttle can carry 30 tons and 8 astronauts]. But this is not all. The American space shuttle has three main engines supplying it the necessary final push before orbiting. Hermes will have no engines of this kind but will be carried into orbit directly by the Ariane V rocket.

Of course, Hermes, like the American shuttle, will have rocket engines for orbital maneuvers. Plans call for three additional rockets to be fed by 2.5 tons of fuel which will permit various maneuvers: Altitude changes [up to 500 km], orbital rendezvous, and braking before landing. Probably the most apparent difference between Hermes and the shuttle is their connection with rockets carrying them into orbit. The shuttle is docked to a giant tank [more than 40 m high] fueling the three main engines, while two additional rockets [the boosters] located on the tank sides supply an extra push for the first minute after launching.

On the contrary, Hermes, with no tanks or engines, will be set on top of the Ariane V rocket, like the old Apollo and Gemini capsules. Hermes will have a further advantage vis-a-vis the shuttle: it will be able to reach polar orbits, which the American shuttle for the moment cannot achieve.

The first European shuttle prototype is scheduled to be built by 1990. In subsequent years, general, thermic, aerodynamic, and electrical tests will be carried out and in 1996 the first flight wiht astronauts on board will take place.

Toward the European Station

If everything goes as planned, Hermes will then perform its first missions carrying European astronauts to the Columbus module docked with the American station. This possibility has already been forecast in a joint NASA, ESA, and

CNES "memorandum of intent." Subsequent Hermes missions could aim at repairing and refueling large automatic scientific or industrial platforms. Even without carrying huge loads, Hermes mission astronauts will carry out repairs, change some equipment, or pick up materials to bring back to Earth [such as films and experimental items].

A bit further away, that is, some years after 2000, Hermes may become an essential instrument for the assembly of the European space station. Columbus module will be directly launced by Ariane V and subsequent Hermes missions will start assembling them. Later the European shuttle will carry new crews, fuel, and equipment, bringing back to Earth the previous shift crew and the results of experiments.

A special pressurized module wil be installed inside the European shuttle hold for possible rescue operations which would require the immediate clearing of the station. In this way, Hermes will be able to carry an additional four to six persons besides the four to six already foreseen in the normal configuration.

Shuttle missions wil leave from Kouru Space Center in Guyana, where Ariane launches are already carried out. Hermes launching operations will be a repetition of previously tested Ariane launches of commercial satellites. The only difference will be the placement of astronauts on board the shuttle, which already will be situated on top of the rocket, a few hours before the launch.

When Hermes leaves Ariane V, its additional engines will push it into the chosen orbit and from there some further precision maneuvers will carry it nearer and enable it to dock with a space station or platform. Should something go wrong, Hermes will be able to remain docked to the station for up to 90 days with all on borad systems functioning. The reentry phase will start when, after leaving the station, Hermes retrofires to slow down its descent and reenters the Earth's atmosphere. In the first phase, from an altitude of 80 to 30 km, Hermes will be subjected to maximum thermic stresses [it "belly" will be heated up to 1,200° C] while during the second phase, when its speed does not exceed Mach 2, the shuttle will prepare to land after the long gliding flight. The Hermes landing runway will be 3,500 m long and 45 m wide, that is, like a normal civilian airport.

One to two months are expected to be needed to set up the shuttle again after one mission. Each shuttle will then be able to fly four to five times per year.

At least at the beginning, the fleet will be formed by two shuttles, which will limit European space missions in the 1990's to about one per month [as with the American shuttle]. The costs of the Hermes project is estimated at 2 billion ECU, or approximately 3,000 billion lire.

According to the CNES plan, 50 percent of the project will be financed by France and the remainder by other European partners. While waiting for the ESA

decision on whether to include Hermes in its projects, eight countries have already declared their interest in the European shuttle [Italy is among them].

Should the Ariane V, Columbus and Hermes projects be developed according to scheduled plans, Europe will become, by 2000, the third space power able to carry man into space using its own means and technologies

[Box, p 86]

Comparative Table

Ariane V/Hermes

Automatic payload	15 tons
Payload [including 6 astronauts and 4.5 ton instruments]	17 tons
Transport capacity in geostationary orbit	5/8 tons

Space Shuttle

Payload	20 tons
Astronauts onboard	7
Transport capacity in geostationary orbit	5

In contrast with the American space shuttle, the Ariane V/Hermes system separates material transport into orbit from astronaut transport. In fact, in its "automatic" configuration it, too, is able to carry payloads into geostationary orbit without requiring a human presence onboard. In the near future, this will allow optimal operations according to actual transport needs.

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AEROSPACE

HERMES DEBATE RAISES QUESTIONS ABOUT FRG RESEARCH POLICIES

FRG Industry Fears Being Left Out

Duesseldorf WIRTSCHAFTSWOCHE in German 3 Jan 86 pp 79-80

[Article: "Countdown for Hermes"; first paragraph is WIRTSCHAFTSWOCHE introduction]

[Text] The French are still holding the door open for participation in the Hermes minishuttle. While the Bonn government still hesitates, the German space flight industry is afraid that it could come up short if participation is shared.

The supply of German-French commonalities has shrunk appreciably. Following the failure of cooperation with respect to the fighter aircraft of the 1990's, given the contrary march directions involving the Strategic Defense Initiative and the halfhearted German involvement in the Eureka project, another problem threatens now. This involves the French-proposed Project Hermes, a smaller version of the successful space shuttle glider: Mounted on the tip of the new Ariane 5 missile, Hermes is supposed to haul 4.5 tons of payload into space during the 1990's and be able to return to earth like an airplane. While this only represents one-sixth of the maximum load capacity of the space shuttle, it would be adequate for Europe in order to reach an important goal--complete space flight autonomy. The Ariane family of missiles has made the Europeans independent of the United States with respect to scientific and commercial satellites, but where the transportation of astronauts is concerned, where the repair of satellites is involved, or where regular supplies for the future Columbus Space Station are concerned Europe would be completely and utterly dependent upon the transport services of the Americans without a vehicle such as Hermes.

Although there is extensive clarity regarding German participation in the large-scale Ariane 5 and Columbus programs within the framework of ESA since the Council of Ministers decision made in Rome in January 1985, a decision by the Federal Government to join in the Hermes project is still outstanding, "although neither Ariane 5 nor Columbus make any sense at all without an instrument such as this," according to the specialized RAUMFAHRT-WIRTSCHAFT newsletter.

Currently, preliminary work on Hermes is still ongoing at sole French expense, but most of the ESA partners have already signaled that they wish to participate in this 4.5-billion-mark program: Italy, Belgium, and the Netherlands, as well as Great Britain, Spain, and Sweden. Even Switzerland, Austria, Denmark, and Ireland would like to assure themselves shares in the project amounting to 2 and 13 percent each. The French have thus far reserved 15 percent for the partner of choice--the FRG, but the courtship has remained completely unheard in Bonn. France would reduce its initially planned share from 50 percent if the Germans wished to participate on a large scale. "The French need allies," believes Wolfgang Finke, the ministerial director responsible for aviation and space flight at the Federal Research Ministry, "and they honestly seek German participation."

As a result of the hesitant position evinced by Bonn, the German space industry, however, sees its spoils floating away: "If we wait much longer with the decision then there will be not much left for us," is the fear expressed by an insider, "then we will have to make do with subordinate subcontractor deliveries." For the Germans this would be particularly painful because they occupied an uncontested peak position in Europe into the 1970's with regard to basic research for manned space flight. When this program was halted in 1973 for lack of appropriations most of the study results were turned over to the friends on the other side of the Rhine River. And the French used the opportunity to proceed vigorously on the basis of these German preliminary studies. The result: They can once more play out their outrider role with the Hermes proposal, as they had already done with the Ariane missile. Federal Research Minister Heinz Riesenhuber--despite his clear propensity for space flight--maintains a conspicuously conservative position with regard to this topic. At the beginning of October, when he outlined his goals to the German Society for Aviation and Space Flight (DGLR) at Bad Godesberg, the word Hermes was not heard a single time. And during his show, as a result of the successful conclusion of the German Spacelab D-1 mission a few weeks later, he approached this topic only with a tortured sparse response: "I would prefer not to describe the process of discussion in the cabinet, but rather only to record the results: A German participation in the Hermes project is currently not feasible within the budget."

However, a few days later a 60-page paper landed on Riesenhuber's desk which had been worked out by a "task force" under the leadership of the German Research and Testing Institute for Aviation and Space Flight (DFVLR) since the beginning of October in an astoundingly short period of time of only 6 weeks. This memorandum, entitled "European Returnable Space Transport System," had been worked on by the MBB/Erno Enterprise, by the Dornier System Enterprise, by the MAN/New Technologies Enterprise, as well as by the Technical University of Munich, the Ruhr University of Bochum, and the Munich Advanced School of the Bundeswehr.

In this position paper, the industry recommends a substantial participation in the Hermes project of 30 percent, despite the fact that several critical arguments were raised against the project. The enterprises involved want to develop, among others, rocket engines for maneuvering in space, as well as the life support system and energy supply system, they want to develop high-efficiency structural components and electronics systems, whereas the DFVLR offers

its services for aerodynamic testing, tests of rocket motors, and simulations. In addition, one of the two Hermes space transporters is to be assembled and completely equipped in the FRG.

As reasons for their not immodest demands, the German space technicians claim that a technological decoupling must be prevented, the Bonn-Paris axis must be promoted, and European interests must be protected. However, the space flight industry rejects the idea of realizing such a project within the framework of the Eureka initiative. It warns that ongoing or soon-to-be-initiated programs such as Columbus, Ariane 5, or Hermes might overlap with Eureka projects. Conversly, in the opinion of the industry, technological and systems-technical experiences gathered as a result of space flight cooperation projects should, in future, be utilized for Eureka programs.

However, while the Germans are still debating whether, how, and when they should jump aboard the already-moving Hermes train, the French have passed one milestone after another. On 18 October, the French space agency Cnes had already assigned the most important responsibilities to domestic industries.

The criticism that Hermes was only a smaller copy of the space shuttle and that, thus, a new technology was discovered with a 10-year time lag with the Americans long since having mastered it is broadly rejected by French Research Minister Hubert Curien: "Hermes is much more maneuverable, can change its orbit, and can remain in space longer." In fact, Hermes is supposed to be able to operate in space for almost 4 weeks--about three times as long as the shuttle. In any event, cockpit technology is supposed to be able to profit from innovations which were developed by the Airbus industry for the model A-320 aircraft.

But the French stress yet another fundamental difference with respect to the space shuttle: While anything but an ideal compromise had to be found between the transport of up to 30 tons of payload and the transportation of astronauts for the American space vehicle, the functions in the European program are separated: Ariane 5 can, as an unmanned rocket, place payloads of up to 15 tons into orbit, whereas Hermes, using the same propellant stages, can serve to transport as many as six astronauts and medium-heavy payloads. Even in the United States there are some experts who not only welcome the European advances in autonomous manned space flight from the standpoint of competition, at least in the opinion of Finke: "Space shuttle remains the heavy truck, whereas Hermes represents a taxicab or light station wagon and as such is an ideal supplement."

According to the optimistic deadline plans of the French, Hermes is supposed to undertake its maiden flight in 1995. However, even Finke himself does not really believe this: "Hermes will cause many a headache until it is completed. One should seriously give thought to a time extension for the program, also for financial reasons." The countdown, which has been offensively pushed forward by the French, however, does not leave much time for the Germans to consider things. After the ESA convention, the national program must be reported to the ESA by mid-1986 for Europeanizing and, after the beginning of the subsequent definition phase, which is to be initiated at the end of

1986, a final 3 months remain for undecided candidates to make their decision. By then, however, the most interesting pieces of this technological pie will have long been distributed, as is feared by the German space flight industry. Finke warns: "We should react rapidly and decisively."

Mitterrand Urges Kohl To Decide

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 16 Jan 85 pp 1-2

[Text] Federal Chancellor Kohl will participate in a joint visit to French troops at Baden-Baden at the invitation of French President Mitterrand this Thursday. Baden-Oos is the location of the headquarters of the French Armed Forces in the Federal Republic. On Wednesday, Bonn figured that Mitterrand would ask the German federal chancellor about the German attitude with respect to cofinancing the French "Hermes" space ferry project. Thus far, Kohl has always referred to the fact that, originally, the agreement was that the planning phase of the project would begin in 1987. France had shifted this date to 1986. During the last encounter with Mitterrand in December in Paris, Kohl had requested that the original time frame be observed in the hopes that, by that time, a joint European financing might be achieved. During the planning time, the Federal Republic would have to annually come up with 20 million marks. At the beginning of 1985, the Federal Cabinet had agreed that apart from assistance for the Ariane 5 carrier rocket and the European contribution to the American "Columbus" Space Station no new civilian space project of this magnitude could be begun. Bonn is now waiting for the French response regarding the time frame for the beginning of the planning phase and, thus, for a response to Kohl. Whether Mitterrand will let his readiness to set the starting time for 1987 be seen on this Thursday appeared to be doubtful in Bonn.

The French are saying that France would hold to the beginning of the planning phase for "Hermes" in the spring of 1986. Despite what the federal chancellor has thus far said, Paris is counting at least on a Bonn cabinet resolution which might contain the intention to participate later in the "Hermes" project. This need not yet be a financing resolution. The French refer to the desires of the German industry to obtain clarity as soon as possible as to whether enterprises of the Federal Republic could begin negotiating with France regarding subcontracts for "Hermes." As for the French side, they say that realization of already-decided development of the Ariane 5 and Columbus projects only makes sense in conjunction with construction of the space ferry "Hermes."

On the other hand, the Federal Government is bound by the resolution of 1985. The Research Ministry of Minister Riesenhuber defends the standpoint that whoever wishes to change something must overturn every resolution and must, furthermore, be able to prove that "Hermes" is the correct technical solution. Currently, this is said not to be possible.

Consequently, a resolution could only be recommended in 1987, after a precise testing of technical alternatives, perhaps of a British project. If, for political reasons, approval must be given now, the obligation cannot be met from the budget funds available at the Research Ministry. The Federal Ministry of

Foreign Affairs, which is clearly meant as the target of such hints, at least favors approval of the "Hermes" project for the long run. In the opinion of Foreign Minister Genscher, one cannot leap over "Hermes" in developing European space technology. Sources in the Ministry of Foreign Affairs state that Genscher, in his meeting with Fr e's Foreign Minister Dumas a week ago, tried to explain that the Federal Repulbic is not employing any delaying tactics, but must conduct a solid financial policy. However, Genscher considers civilian space technology to be decisive for the economic future of the European countries. Despite his favoring the project, even Genscher does not expect a decision to be made at the time of the next regular German-French consultations at the end of February in Paris. After the most recent discussions between Kohl and Mitterrand, Bonn had placed weight on the fact that the Federal Republic would be spending 2.7 billion marks in 10 years for Columbus and another 1.7 billion marks, again over a period of 10 years, for the Ariane 5. The Federal Republic cannot enter upon new expensive obligations in an unlimited manner.

The research policy spokesman of the Union Bundestag faction, Lenzer, recommended the realization of German participation in "Hermes" before Kohl met Mitterrand because only in conjunction between Ariane 5, Columbus, and the "development of a European return-capable space transport system" can the goal of an independent Europe with respect to space technology be reached. Also, use of space for defense purposes must be drawn into considerations.

Kohl and Mitterrand have only set aside the period of 45 minutes for substantive topics--apart from eating together. The troop visit is primarily symbolic in meaning for German-French relationships and the presence of French troop units on German soil. The federal chancellor wants to bring up four areas of German-French cooperation: political-strategic cooperation must be strengthened just as much as military-operational cooperation; the armed forces are to be brought closer together during exercises and training; joint advanced training of leadership cadres is to be made a reality in practice. If there is time, the federal chancellor and the president might confirm their intentions in general form regarding the fact that Paris and Bonn would have to think about a joint European initiative for defense against short-range and medium-range missiles. In such a nonautonomous European defense initiative, Bonn believes that this could mean a supplementing of the American SDI programs in coordination with the United States.

Precise positions with regard to procedures on the part of Europeans in East-West forums such as the Vienna MBFR negotiations regarding troop reductions in central Europe and at the Stockholm Conference for Confidence-Building and Disarmament in Europe, all the way through to an always "constructive accompaniment" of American-Soviet negotiations in Geneva, were agreed upon by Genscher and Dumas. Parallel with the exchange of troop units and the joint training of general staff officers--a topic on which Kohl and Mitterrand communicated--French diplomats and those of the Federal Republic are to be permitted to train and later temporarily work in each other's foreign services, in order to be able to perform their work there. Four times each year all political personnel of all German embassies are scheduled to meet with French diplomats in their host countries. The foreign ministers also plan four meetings each year. Genscher visualizes joint definition of the security-political

interests of France and the Federal Republic, the results of which are to be applied to the Western opinion formation with respect to disarmament negotiations and developments in space. The federal chancellor anticipates a response by the French to his initiative which proposes the establishment of a joint body for treating all space questions from their civilian as well as military standpoints.

Genscher's Position

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 20 Jan 86 p 4

[Text] Federal Foreign Minister Hans-Dietrich has expressed himself in favor of participation by the FRG in the development of the French space ferry "Hermes." On the weekend, Genscher said in front of journalists in Munich that he takes seriously the most recent expert positions which claim that construction of the space ferry is an indispensable intermediate step prior to the next step in space, which is the development of a space aircraft. Naturally, a problem of financial policy priorities does exist. "That will have to be discussed again," said Genscher.

Genscher underscored the great significance of intensive German-French cooperation in technological areas as well. Close cooperation between both countries was said to be a "fateful mission." In Europe, "whatever Germany and France do jointly goes--but only that." The foreign minister indicated that the diplomatic services of France and the Federal Republic would, within 10 years, be melded together. He had agreed to this with his French colleague Roland Dumas on 7 January. The directors of foreign services are to meet once a month and the ministers four times a year with their collaborators for joint consultations. Four times a year, leading workers at embassies everywhere in the world are to meet and discuss problems of the host country.

Furthermore, an exchange of young diplomats and other collaborators is planned. Cooperation among the health services and the courier services is also conceivable, as is the joint issuance of visas. "I would like to achieve a status in which, through cooperation both in thinking as well as in organization, our foreign services would grow together to such an extent that even a malicious person could not separate them again." He expects that the remaining countries of the European Community would then follow the example.

Genscher warned the journalists against making foreign policy an election issue. The FDP profited from a well-thought-out foreign policy, but it is not following this policy for the sake of the elections. "I can also advise everyone else against that. Foreign policy involves national interests. It is no percussion instrument to be used during the election struggle." Genscher thought that the FDP was counting on the support of the electorate for its enlightened foreign policy. And in reference to the most recent discussions centering on his remaining in the Foreign Office, he felt: "In Germany, we elect quality." Genscher said that he did not feel threatened in his office either by the chairman of his party, Federal Economics Minister Martin Bangemann, nor by CSU Chief Franz-Josef Strauss. He also sees no rivalry between himself and Strauss. "This cannot even exist. There is one government and

one division of portfolios." Genscher referred to the fact that all foreign policy decisions are made unanimously in the Federal Cabinet. It is possible, he said, that some other opinions existed among tne parties which are part of the government. But the Federal Government is a constitutional organ which makes its own decisions. And these decisions are also defended by it.

Genscher feels that the FDP had terminated its coalition with the SPD because the latter party had changed its foreign policy and security policy positions. This would explain why the FDP is now continuing the former foreign policy and security policy. The FDP understands its role now as before to be that of a freedom, progress, and peace party. If Strauss expresses discomfort with respect to the foreign policy continuity, it was not his [Genscher's] task to comment on the situation.

FDP Criticizes Riesenhuber's Policies

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 24 Jan 86 pp 1-2

[Text] The FDP joined in the criticism by the opposition of research subsidies for concerns on Thursday. In a fundamental debate regarding research policy with focal points for assistance to the economy, space policy, and environmental research the research policy spokesman of the FDP, Laermann, criticized Minister Riesenhuber for having deviated from the reorientation of state research subsidies, which had begun with the change in government, by helping to finance microchips at Siemens and at the Philips sister enterprise Valvo. By making substantial contributions to these two concerns, Riesenhuber is accused of making the case worse rather than better because the enterprises permit state interference for the sake of the money. Laermann contradicted the opinions of the research policy spokesman of the CDU faction, Lenzer, who said that this dispute in the coalition about research subsidies to concerns was only an academic discussion. Riesenhuber's decision goes to the core of research policy.

By subsidizing such a strong financial enterprise as Siemens, the research policy spokesman of the SPD faction, Vosen, claimed that the call by the federal government to the economy for more initiative and effort becomes incredible. Whereas Vosen charged the research minister with additional research policy gaffs, he did welcome his research policy as a precise continuation of the leading SPD policy line. Vosen and his faction colleague Fischer (Homburg) and Stahl (Kempen) raised the criticism that technical-scientific cooperation between the Federal Republic and France was being endangered by Riesenhuber and by the unclear position of the Federal Government with respect to the French "Hermes" project. As far as the Greens, Deputy Mueller (Bremen) rejected "Hermes" with the justification that it was nothing short of a gigantic grab for tax money.

Riesenhuber defended his research policy as being newly oriented in fundamental points. Basic research had been considerably expanded and the bureaucracy had been reduced. Environmental research, which previously practically did not exist, is voluminous today. Never before had such a high share of research money flowed to middle-size enterprises. The approval of funds for

Siemens and Valvo was justified by Riesenhuber as being of national interest. The state-sponsored partnership of both enterprises was creating the prerequisites for providing German industry with the most modern components in sufficient time. The disputed project had been contained in the government report entitled "Information Technology," which had been unanimously approved by the cabinet. This is an integrated program in conjunction with larger and smaller enterprises, involving the state and the economy. The government's research policy was responsible for expanding knowledge, conserving the environment and resources, and improving the competitiveness of the economy. Lenzer, together with CDU delegate Boroffka, Keller, and Schneider (Idar-Oberstein), pronounced Riesenhuber's research policy as successful, realistic, and substantively competent.

In response to SPD criticism of federal space policy, Riesenhuber replied that large-scale projects would have to be thoroughly tested for their necessity and financability. At the beginning of 1985, the cabinet had decided that, following German participation in the American "Columbus" Space Station and further development of the European Ariane rocket, there was no money for other large-scale projects. The fact that the Federal Government was claiming a lack of funds with respect to the "Hermes" project was criticized by Vosen and blamed on Riesenhuber. Since taking office, the research minister had overspent by handing out contracts valued at 18 billion marks. Stahl expressed the concern that Riesenhuber and research policy within the cabinet would be pulverized, since today research policy is far more influenced by the finance minister than by a substantive minister.

In responding to demands made by the Greens, brought up by Deputy Schierholz, that large-scale research establishments, beginning with the Nuclear Research Institute at Juelich, be brought into line ecologically, Riesenhuber responded that the new orientation at Juelich also takes ecology into account. However, he said, that research facilities were not intended to concentrate on ecology.

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AEROSPACE

AERITALIA, ITALIAN SPACE AGENCY, AEROSPACE FIRMS PROFILED

Florence JP4 AERONAUTICA in Italian No 1, Jan 86 pp 27-27

[Article by Giovanni Caprara: "Space Industry in Italy"; Box p 24 by Massimo Bozzo]

[Text] The ever growing commitment of Italian industry in space activities leads us to draw up a profile of the sector in order to determine--through statistics--the extent of Italy's participation in one of the most advanced fields of the production sector. Another reason leading us to draw up the following overview was the fact that, today, this group of industries is on the verge of an important breakthrough resulting from the American SDI program [Stragetic Defense Initiative] and from the European Eureka program.

The group of Italian companies involved in space activities represents different areas of expertise ranging from mechanics to electronics, and from optics to chemistry. All these specializations are of fundamental importance to the new requirements related to space defense. As can easily be foreseen, this will have a considerable effect on the nonmilitary sector and especially on electronics. It is undoubtedly a fallacy to consider this sector simply as a limited area of specialized production since, in addition to already being a leader in production fields, in the future it will also give rise to extremely advanced technology which can be, in turn, transferred to other different sectors.

To return to our overview of the sector, we would like to point out that some small companies, which have just recently entered this sphere of activity and are subcontractors to other major companies, have been excluded. Furthermore, other companies--such as Fiat Aviation--will not be mentioned here since they have just recently started their involvement in space activities by taking part in the program of the HM-60 cryogenic motor for the Ariane V rocket. From our survey, which comprises 13 of the most important companies operating today, we see that the overall turnover was 380 billion lire. Therefore, if these figures characterize the level of space production, which is already well established, and if we also take into account those companies which have just recently entered the sector and which will only produce a turnover in the next few years, then we are correct to assume that the number of people involved in the sector exceeded 3,000 in 1985.

AERITALIA S.A.I.P.A.--Energy and Space Group--Corso Marche 41 10146 Torino

The space activities of Aeritalia [IRI/Finmeccanica group], which is the largest aerospace industry in Italy, are carried out in plants in Turin under the supervision of Prof Ernesto Vallerani.

The company deals with product management, although it specializes in structural activities. Today, Aeritalia takes part in numerous domestic and international programs, which can be summarized as follows: After directing the Italian involvement in the Spacelab program, the space laboratory that was placed in orbit by the shuttle, Aeritalia is presently working on the new Columbus space ministation program. It was this company, together with the German company MBB, which promoted this program. Aeritalia's responsibility consists of the construction of the pressurized "living space" module. The company also takes park in other programs such as the Eureka platform, the Hipparcos astrometric satellite and, with regard to telecommunications, the ECS, Marecs, Telecom, and Olympus satellites.

At the national level, Aeritalia takes part in all approved programs. Among these we must mention the IRIS launcher, the Tethered satellite [connected to the shuttle by a "cable"], the SAX scientific satellites for astronomy and X-ray studies, the Lageos for geodynamic studies, and, in the field of telecommunications, Intelsat. Aeritalia has also carried out research on the large platforms for forthcoming telecommunications applications. There are 350 people in the Aeritalia space department and in 1984 turnover totaled 100 billion lire.

Carlo Gavazzi Controls--Via G. Ciardi 9-201148 Milano

Carlo Gavazzi runs a space department which works on domestic and European contracts [with ESA for the Giotto project]. This company manufactures equipment for experiments involving sensors and electronics applications and also develops software for use in satellites.

There are 32 people employed in the space department, while turnover amounted to 2.5 billion lire in 1984.

Contraves Italiana--Via Affile 102--00131 Roma

The activity of this company, which only started to operate in the space sector in 1980, concerns the field of satellite telecommunications and remote monitoring. The work underway includes a mircowave sensor for remote monitoring and 20/30 Ghz earth terminals; the latter are linked to ESA programs. There are 10 people involved full time in the space sector and turnover amounted to 1 billion lire in 1984.

FIAR--Italian Manufacturer for Radioelectric Equipment--Via Montefeltro 8-20156 Milano

Since 1962 FIAR has expanded its activity in electronics to include the space sector. Beginning this year the company has its own independent space department headed by the engineer Armando Rovatti.

FIAR specializes in on board systems, development and constructions of high and low-voltage feeding units and various telecommunications packages, including local oscillators and feeders [EPC] for the final power supplies.

FIAR participates in the following ESA programs: the ISP/Ulisse probe, which will be used to explore the solar poles, the Giotto probe, the Eureka platform, the Olympus Telecommunications satellite, and the Ariane carrier. It also takes part in the French project for the SPOT satellite, which has been designed to study land resources. Work has already been done on telecommunications satellites such as the ECS, TV-Sat/TDF, DFS Copericus, the space telescope, the projects of the Italian Iris and Italsat Space program, the ESA ERS-1 satellite designed for land resource applications, and the IRS and Tele-X satellites. The company's interests and activities are now moving into the field of space robotics.

Today, there are 150 employed in the space department, while sector turnover in 1984 amounted to 10.7 billion lire.

GTE Telecommunications--SS 11 Padana Superiore--Cassina de Pecchi--20060 Milano

GTE operates in the fields of space telecommunications and manufactures satellite components, particularly land stations.

The instrumentation manufactured includes amplifiers, convertors, antennae, demodulation units and so on. Today the company takes part in programs concerning the Olympus, ECS, Telecom G-STAR, Intelsat and Italsat satellites.

There are 300 people employed in space activities, with a turnover of 16 billion lire in 1984.

Laben--[Division of the SI.EL. SpA]--Via E. Bassini 15--20133 Milano

Laben, which is now part of the American ISC group [International Signal and Control Group] which is still a division of SI.EL, which deals almost exclusively in space activities. Marco Gerevini is the engineer in charge of it.

Laben's activities are connected to ESA European programs and also to those of the national space plan. Laben specializes in the design and construction of data handling systems, that is, the management system of on board data of satellites and probes.

This company takes part only in ESA programs: ISPM/Ulisse for the study of solar poles, Giotto for close-up surveys of Halley's comet, the ERS-1 satellite for land resource applications, and Hipparcos, an astrometric satellite which will take a "star census." Among the programs connected with the national space plan we find: the IRIS launch module, Italsat, a telecommunications satellite, and Tethered, the satellite that will be connected to the U.S. shuttle by a cable.

Future programs include participation in the Columbus project, the European space ministation, and in HM-60, the Cryogenic booster of the new ESA carrier rocket Ariane V.

Two hundred people, at the moment, are employed in the Laben space department and in 1984 its turnover amounted to 18 billion lire, 53 percent of which was from exports to Europe.

Microtecnica--Via Madama Cristina 147--10126 Torino

In the past, Microtecnica was involved in the ESA spacelab project and dealt with the execution of active heat control of the environment. At present, this company is working on a post-Spacelab phase, supplying ESA with other parts of the system. Heat control is still the primary area, although not the only one, Microtecnica is focusing on. In this respect, the company has manufactured heat control systems and a video optical control designed for the ESA Eureka platform. With regard to the IRIS launcher module project, the Turin company will produce the rotating table.

Furthermore, Microtecnica is already dealing with heat control of the European Columbus ministation, which is part of ESA's new programs, and also with control valves for the liquid hydrogen and oxygen HM-70 cryogenic motors for the Ariane V carrier.

There are 40 people involved in the Microtecnica space department, while turnover exceeded 5 billion lire in 1984.

Galileo Workshops--Via Einstein 35--Campi Bisenzio--500013 Firenze

Galileo Workshops specializes in the design and manufacture of satellite attitude measurement sensors which determine the attitude of satellites with respect to inertial points of reference or specific celestial bodies. The most common ones are ground infrared sensors, solar sensors, and astral sensors.

Today, Galileo Workshops participates in the following international programs: Marecs, Skynet, Olympus, Eureka, ISPM/Ulisse, Giotto, Telecom, ECS, Spacelab-1, and Hipparcos. The Italsat Satellite is among the Italian programs.

In addition to sensors, Galileo Workshops also supplies components for special optics and optical observation systems in space.

Among these we must mention the lighting systems for the Spacelab fluid physics module, a collimator for the Exosat satellite, a video optical system for Eureka, a subsystem for biological observations for Spacelab and defense and mirror for a multi-color room of the Giotto probe.

Fifty-five people are employed in the space sector of Galileo Workshops whose turnover amounted to 5 billion lire in 1984.

Selenia Spazio--Via di San Alessandro 28/30--00131 Roma

Selenia Spazio [the Selenia-Elsag group within IRI/STET] is the first company in Europe to be fully involved in the space sector and manufactures instrumentation for telecommunications, remote monitoring meteorology, and space transport. Furthermore, part of the company deals with the construction of land stations for transreceiver systems.

Selenia takes part in numerous programs both at a national and international level. Therefore, we will mention only the most important ones. In telecommunications, Selenia takes part in the Intelsat IV, V and VI programs, Olympus, and Italsat. In meteorology and remote monitoring, the Meteosat and ERS-1 programs must be mentioned. In the field of space transport, Selenia Spazio manufactures equipment for Ariane III and IV.

The future programs of Selenia Spazio include participation in two major ESA projects: The Columbus space ministation and the Ariane V super rocket. However, the ministation project will also involve other activites linked to on board data processing and transmission, space robotics, and sensor radars for docking operations. These three areas of activity employ a total of 940 people. Turnover amounted to 92 billion lire in 1984.

SGS-ATES--Via C. Olivetti 2--Agrate--20041 Milano

This company supplies electronic components for different space programs [SPOT, Olympus, Meteosat and so on], and maintains active participation in the most important domestic and international programs. It is impossible to determine the number of people involved in the space deparment since employees also deal with other areas of production. The sector turnover amounted to 6 billion lire in 1984.

SIRTI--Via Pirelli 20--20124 Milano

SIRTI started operating in the space field in 1961 and since then has always cooperated in programs through the manufacture of land stations for transreceiver systems.

There are 50 people involved in the space department. Turnover amounted to 5 billion lire in 1984.

SNIA BPD--Via Sicilia 162--00187 Roma

SNIA BPD displays a constant commitment in the field of space propulsion. In November 1983 it became SNIA BPD through the merging of SNIA Viscosa with BPD Defense and Space and now groups together a number of different activities. The main part of the space work is accomplished in Colleferro, under the direction of engineer Giuseppe Grande, research and development director.

The programs underway involve solid, liquid, cold-gas, and magnetoplasmadynamic propulsion. In this connection, SNIA manufactures apogee motors of the MAGE series for installation on satellites: Meteosats use MAGE-1, Giotto and Hipparcos probes will be equipped with MAGE-1S, and Telecom and ECS telecommunications satellites with a MAGE-2.

With regard to the Ariane program, the European carrier, SNIA BPD builds the small rockets operating on solid fuel propulsion used in the detaching operations of the different carrier stages and the boosters for takeoff. The latter are powerful rockets, operating on solid fuel propulsion, each weighing almost 9 tons. SNIA BPD started in the liquid propulsion field by participating in the Olympus satellite program and continued by participating in the new Italian satellite Italsat project. Cold-gas propulsion was used for the IRIS propulsion module program to be used on the shuttle for the transfer of satellites to geostationary orbits. A magnetoplasmadynamic motor for the attitude control of satellites is being tested for more advanced systems.

SNIA BPD, together with the French company SEP [with which the company has formed a consortium], will be responsible for the construction of two large boosters necessary for the new European Ariane V super rocket, which is part of ESA programs.

The SNIA BPD space department employs approximately 200 people; turnover amounted to approximately 45 billion lire in 1984.

Telespazio--Via A. Bergamini 50--00159 Roma

Telespazio belongs to the IRI/STET group and is the sole licensee of the Ministry of Posts and Telecommunications for the installation and mangement of satellite telecommunications systems in Italy. Therefore, Telespazio is the only "contractor" in Italy for space telecommunications systems [land stations and satellites] for national, European, and intercontinental connections, which are used by Italian and foreign traffic authorities. In addition to this activity, Telespazio supplies--on a competitive basis--other services concerning satellite telecommunications such as remote monitoring, control of satellites in orbit, operation of scientific stations along with studies and consultancy activity.

The company works through stations located in the Fucino plain [Piero Fanti Station] and the Lario Station, on Lake Como. Telespazio also manages for CNR the Matera station, which uses lasers to carry out measurement activities with NASA geodetic satellites.

Telespazio employes 650 people; turnover amounted to 73.3 billion lire in 1984.

Among the companies that have just recently started to deal with space activities, we have to point out--in addition to the already mentioned Fiat Aviazione--the following companies: Italtel, Telettra, Face Standard, Galvotek, and Eurobit.

[Box, p 24]

The Italian Space Agency

The Italian Space Agency will direct all national space programs as well as those organized in collaboration with international bodies, with the aim of centralizing costs and controls, which at the moment are divided between the National Council for Scientific Research and the Ministry of Foreign Affairs. At the moment, Italy spends an average of 200 billion lire a year [third after France and West Germany] on the programs of the European Space Agency and another 200 billion on national programs.

The institution, which was proposed by the minister of research, Senator Luigi Granelli, was approved by the Cabinet on 6 August 1985. The agency will have a small, flexible structure and will not have research personnel of its own; rather, it will coordinate and direct space programs and control their implementation. It will be given sufficient autonomy, but it will have links with the Ministry of Research, with CIPE [Interministerial Committee on Economic Planning], and with Parliament. It will be able to use the services of skilled personnel with a high degree of mobility, who will be be paid and engaged on a private, temporary basis. Its administrative procedures will make it possible to establish regulations which may even overrule traditional provisions in order to define private contracts with industry. With regard to supervision of its work, the agency will have to prepare a report on programs, operations, and results for submission not only to CIPE but also to Parliament. Fifty billion lire have been allocated for the first 3 years of activity.

During a press conference in Rome, Granelli emphasized that, among the programs scheduled by the agency, there is also one concerning the upgrading of the satellite control station and of the San Marco launching platform [owned by the Center for Aerospace Research of Rome University, directed by Prof Luigi Broglio] within the framework of an agreement with Kenya and France on scientific satellites and satellites for land resource applications. The next San Marco satellite, the D-L, will be launched in April 1986.

On 5 December 1986, the bill concerning the agency was assigned to the Public Education and Industry joint commissions of the Senate, which will examine it in the relevant office. According to Mr Granelli, approval will take no longer than 6 months.

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BIOTECHNOLOGY

FRENCH, EUROPEAN STUDIES OF MICROGRAVITY

Paris BIOFUTUR in French Nov 85 pp 27-34

[Article by M.F. Chevallier: "Biology and Bioindustry in Space"]

[Excerpts] Making the best use of opportunities for biotechnical research in space: This article gives an overview of current research programs in the field of cell biology in space and on their prospects for industrial applications.

Space: An Overview of Technological Alternatives

One of the problems in obtaining products through cell culture is their excretion outside the cell. As long as this fundamental aspect is not mastered, we will have to proceed with the extraction and purification of the desired molecule amid other cell components. This is all the more necessary because the purity criteria imposed for the marketing of new pharmaceutical products derived from biotechnology are very severe. Hence, the interest of manufacturers in EOS [Electrophoresis Space Operation] is directly dependent on this economic criterion because the alternative techniques at their disposal on earth are relatively limited: affinity chromatography and cell sorting (which is not used for preparative purposes). Molecules and cells considered for EOS are classified according to an evaluation index by their cost and pharmacological interest: beta pancreatic cells (diabetes), alpha antitrypsin (emphysema), erythropoietin (anemia), interferon (viral infections), antihemophilic factors (hemophilia), etc.

The first cell separations involved urokinase-producing kidney cells, growth hormone- and prolactin-producing hypophysial cells, and insulin-producing pancreatic cells. These apparently successful purifications show the benefit of EOS in a new therapeutic perspective, namely, the atraumatic implantation in human beings of purified cell fractions to correct a metabolic dysfunction.

In recent years, another technological development associated with EOS has emerged: cell culture and cell fusion under weightless conditions. Incubators and adapted culture chambers are being tested (Cogoli apparatus). Germany is developing an apparatus to be ready in 1988 (the Biotex) that combines cell fusion, incubation, and separation through electrophoresis. An

electrofusion process was studied during a recent flight. Hybridomas have thus been obtained in an unprecedented way: In a nonhomogeneous electric field and in the absence of cell sedimentation, cells arrange themselves according to a geometrical pattern that facilitates fusion. Hence, programs involving live cell modification will develop rapidly.

Another consequence of weightlessness concerns the growth of protein crystals. The advantages of the absence of convection and sedimentation phenomena for crystal growth have already been exploited for silicon and gallium arsenide semiconductors. The possibility of rapidly synthesizing regular protein crystals is very attractive to biochemists and pharmacologists, who will then be able to study them with X rays. In 1983, Professor Littke (Freiburg University, FRG) directed a protein crystallization program in Spacelab 1. Two proteins were crystallized:

-Lysozyme, a reference material because its tridimensional structure was determined nearly 20 years ago. Crystals 1,000 times larger were obtained;

-Beta-galactosidase, whose tridimensional structure could never be elucidated because no crystals suitable for X-ray crystallography were available. During that spaceflight, this enzyme crystallized in the form of needles 27 times larger than those obtained under gravity.

In the United States, NASA has opted for establishment of a manufacturers' association in close cooperation with the University of Alabama. It includes several companies: Upjohn, Smith, Kline and French, Merck, Schering Plough, and Burroughs Wellcome Upjohn. Three proteins were crystallized in Spacelab 2: a bacterial phosphorylase nucleotide purine (PNP), the C protein of human origin, and lysozyme. In France, manufacturers are aware of the importance of this research. Therefore, an agreement was signed recently (3 June 1985) among the CNES [National Center for Space Studies], Aerospatiale, and some pharmaceutical companies (Rhone-Poulenc, Roussel-Uclaf, and Sanofi). During the initial (1-year) period, the agreement covers development of equipment for crystallizing proteins and analyzing the crystals by X-ray, as well as estimating costs for its development and operation. The fact that these manufacturers are collaborating to develop their own space research equipment ensures that the scheduled experiments can be kept confidential in terms of both the nature of the protein and the end results. It is clear that this research will expand because knowledge of the structures of the active centers of certain proteins will permit development of new, more efficient "customized" drugs. In the longer run, other markets such as the manufacture of biotransistors (biochips) will perhaps develop.

Cell Biology in Space

In addition to interest in fundamental research, knowledge of gravitational effects on cell biology seems essential for efficient development of space biotechnologies (cell cultures, cell fusion, purification, etc.) and for understanding the origin of physiological changes in astronauts (loss of bone calcium and decrease in the immuno-defense system). It is a new field still devoid of results that is opening for biologists. Observations of natural phenomena on earth (geotropisms, geotaxis) or studies in centrifuges on the first stages of embryonic development, together with theoretical

considerations on cell organization (movements, cytoskeleton, etc.), constitute a first group of arguments supporting the existence of cell mechanisms for sensing gravity (box 3). Whereas experiments conducted in recent years in first-generation space vehicles have supported initial data by offering interesting results, second-generation vehicles (shuttle, spacelab, space station, etc.) will permit new development in space research in cell biology. Fourteen European experiments were conducted during the Spacelab flight of 30 October 1985, four of which were French, directed by Perbal, Planel, Tixador, and Bouteille (see box). What is at stake?

Would a bioreactor in microgravity be conceivable and what would be its advantages? First, the significance of cultivating cells in the absence of gravity lies in the possibility of controlling and maintaining a constant environment around each cell. These cells would be concentrated within a single volume without sedimentation taking place. Thus, they need not be stirred to keep them in suspension. Moreover, in gravity, cells consume a certain amount of energy to move and to keep their shape. In microgravity this energy consumption is less necessary, and one may hope--if not plan--that cells will use this energy to multiply and excrete biological products. Hence, the first step is to determine the existence of direct or indirect gravitational effects on cells. Therefore, the experiment directed by Professor Planel's space biology research team from Paul Sabatier University (Toulouse) will deal with the proliferation and growth of paramecia. It is the continuation of the Cytos experiments conducted in the Salyut-6 orbital station in collaboration with Moscow's Institute for Medicobiological Problems. These experiments demonstrated a considerable increase in the proliferative activity of protozoa. This proliferation was also linked to a reduction in dry weight and total proteins, to an increase in cell volume, and to a modification of the intra- and extracellular electrolytic distribution (calcium drain). However, this combination of effects has not been found for other cell categories. During a Skylab flight, for instance, no change in proliferation was observed in human embryonic pulmonary cells (WI-38 line), whereas, during a Spacelab-1 flight, lymphocytes activated by means of concanavalin A showed a considerable decrease in proliferative activity (97 percent). Is this result, obtained by Cogoli and colleagues in 1984, linked to the lower reactivity of these cells to mitogenic substances observed in space-station astronauts upon their return to earth? No one can tell. It is also necessary to understand the differences in the results obtained under the influence of a reduced gravitational factor and to be able to establish a theory about the biological effects of microgravity (box 3)!

Another category of cells is the subject of special studies because of biological problems space-station astronauts have to deal with: blood cells. The reduction of about 10 to 15 percent in the corpuscular mass and of 20 to 30 percent in the reticulocyte level is partly explained by the existence of a hyperhemolysis and variations of the erythropoiesis. Soviet experiments have taken place, and a certain number of measurements on rats and humans are being considered. They will take place during a future Spacelab flight (not after the return to earth) and concern incorporation of radioactive iron, a reticulocyte count, a quantity determination of erythropoietin, a determination of the corpuscular mass, and research into hemoglobin derivatives.

Among the effects related to microgravity, the enhanced resistance of the Escherichia coli and Staphylococcus aureus bacteria to antibiotics should also be mentioned (Tixador and colleagues). This phenomenon seems to be linked to modifications of the cell wall. The first experiments on bacterial flora by J.L. Chretien in July 1982 will be continued during future Spacelab flights.

Understanding of developmental processes is the second goal of space research into cell biology. Following Knight's classic experiments back in 1806 ingeniously showing the influence of gravity on the orientation of plant organisms, cell biology has been accumulating new data during the last few years. Thus, the experiment directed by Professor Perbal (University of Paris VI) deals with the cellular mechanisms of geotropic growth in lentil roots. The statocytes in the root cap are cells that make the root sensitive to gravity. These cells have a special structural organization: They contain numerous small high-density organelles called amyloplasts. These are located at the bottom of the statocyte and show the root which direction to follow in order to grow. Under weightless conditions, the cell distribution of the amyloplasts is more homogeneous because their high density no longer influences their disposition. Hence, one may wonder how statocytes cultivated in space will reorganize themselves and how the roots thus modified will react to gravity. To answer this question, a first batch of seedlings has been cultivated in microgravity during Spacelab's October flight. A second batch has been centrifuged in order to restore normal gravity. Will it perhaps be possible, by comparing these two batches of seedlings, to understand the mechanisms of geotropism and to plan for development of plants in microgravity?

In another field, embryonic development, one of the scheduled experiments concerns determining the organism's future blueprint for bilateral symmetry. This experiment will be carried out on eggs of batrachians fertilized in space. This research is also an essential prerequisite for development of any kind of life in space.

[Box, p 32]

Effects of Microgravity in Cell Biology

Higher Plants:

-Geotropism and role of the amyloplasts (studies on earth);

-Disproportionate development of plants (in-flight tests).

Unicellular Organisms:

-Increase in cell proliferation (paramecia, salmonella);

-Survival of viruses, bacteria, fungi, etc.;

-Modification of resistance to antibiotics (E. Coli, Staphylococcus);

-Induction of lysogenic bacteria with release of bacteriophages.

Insects:

-Acceleration of aging (drosophila);

-Precocious chromosomal translocations (drosophila).

Vertebrates:

*Development:

-No modification of the development of eggs fertilized on earth (rats, xenopus).

*Differentiated organisms:

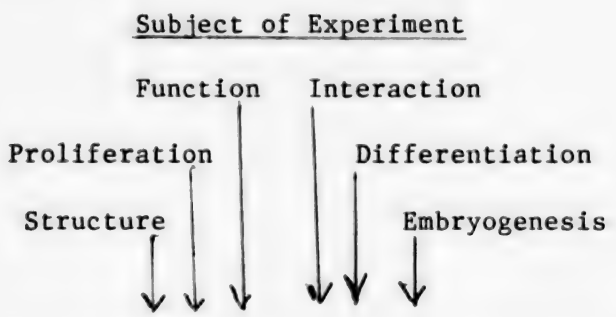
-Inhibition of bone growth in rats (osteoporosis of astronauts);

-Lower energy consumption: increase in the hepatic glycogen level, lower glucose consumption by pulmonary fibroblasts;

-Decrease in the red-corpuscle level (rats, astronauts);

-Decrease in lymphocyte activity (astronauts).

Table, p 33. Experiments of Mission D-1 Carried Out in the Biorack (Flight of 30 October 1985)



Project Director		Effect of	Organism
M. Bouteille	F	Microgravity	blood cells
H. Keller	CH		leucocytes
G. Perbal	F		lentils
H. Planel	F		paramecia
H.J. Rhaese	D		bacteria
R. Tixador	F		bacteria
V. Sobick	D		mold
A. Cogoli	CH		lymphocytes
O. Ciferri	I		bacteria
G.A. Ubbels	NL		amphibian eggs
R. Marco	E		drosophila eggs
H. Buecker	D	Radiation	insect eggs (phasma)
H. Buecker	D		
D. Mergenhagen	D	Orbit	green algae

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CSO: 3698/1036-A

COMPUTERS

ESPRIT, SIGMA, ALVEY ADVANCED SOFTWARE PROJECTS COMPARED

Paris ZERO UN INFORMATIQUE HEBDO in French 9 Dec 85 p 61

[Article by Bruno Daniel-Jausine: "France, Your (Software) Engineering Is a Mess"; first paragraph is ZERO UN INFORMATIQUE HEBDO introduction]

[Text] During the international study days recently held in Paris under the auspices of Eurosoft, it was possible to construct an interesting panorama of the different national and international R&D programs in software engineering and in advanced data processing technologies.

It is a question of unblocking the crisis in software, the global demand for which is exploding at a rate easily double that of production capacity.

After an initial reaction in the form of an almost frantic research effort to discover completely new development techniques, the orientation of the last 2 or 3 years seems to be directed toward the solution of a problem of technology transfer.

The real hesitation seems to be situated more at the level of profits expected from research spin-offs considering, on the one hand, the size of the sums to be invested and, on the other, the slowness in transferring research towards industry: Industrialization time averages 19 years, roughly the age of the software industry itself. . . .

It is also interesting to compare the approach of the different programs discussed later in this text, nearly all of which involve cooperation at the level of precompetitive research: The goal being in all cases to come to operational products as quickly as possible.

Honor to whom honor is due: The so-called fifth-generation Japanese computer project, which started in 1981, is the leader. Encompassing hardware as well as software, it has been the subject of intense publicity regarding the production of so-called "intelligent" machines. In fact, it seems that a certain reshaping is taking place in the control of logical inferences in parallel processing machines and more particularly in the associated software. Moreover, the Japanese government funds are beginning to diminish.

Kamikazes or Ants?

Its role is in fact limited to the design and management of prototypes which the parallel programs of industry utilize in developing commercial products.

Despite official proclamations of cooperative research on an international level, the fifth-generation project is an organization carefully tailored to Japanese culture.

The complementary SIGMA project, oriented toward software engineering, also exists in Japan. It is based on a Unix extrapolation, and, in this respect, is related to the PCTE [not further identified] project of ESPRIT [European Strategic Program for R&D in Information Technologies].

With a $100-million budget, the SIGMA project intends to favor the industrial production of software by emphasizing an intensity of knowledge over that of labor. Its watchword is derived from the idea of the accumulation of efforts. It is characterized by the establishment by 1990 of some 10,000 developmental and, testing or information retrieval sites linked to the sale of products around a network providing a tremendous range of tools, modules, and technical data.

This program subcontracts all development and is managed by the ITPA (Information Technology Promotion Agency) of the MITI [Ministry of International Trade and Industry] with the cooperation of industrialists. Its operation is overtly commercial; sales take place through the network itself.

The American Streamroller

No less than four parallel programs are under way in the United States. Stars, a DOD [Department of Defense] program, gives priority to the problems of software reutilization and the suitability of human resources. It focuses on an industrial rather than a conventional approach centered around methods and languages. ADA [a programming language], its keystone, can be considered in this context as either a language or a slogan permitting the advance of such a program.

The considerable funds invested (starting with $5 million in 1984 and culminating in nearly $60 million in 1990) are to be set against the expected software costs: $10 billion in 1984, $90 billion in 1990.

Finally, the program seeks to pave the way for the management of projects and techniques according to current business standards.

A special place must be given in all of this to the establishment of a Software Engineering Institute with federal funds. It is the first federal research laboratory since the development of the A-bomb.

Piloted by the Carnegie-Mellon University, the program basically focuses on the evaluation of existing technologies and on the provision of software licenses.

Hence the main lines of study in the program's principal projects; the identification and evaluation of technologies, the nature of technological transition, training, even retraining, reutilization, and automation, the design and integration of systems, and the consideration of operation processes in software engineering.

The MCC (Microelectronics and Computer Technology Corporation), which can be considered as American industry's reply to the fifth-generation Japanese project, covers a broader field. Uniting 21 large private companies, it has more in common with the British Alvey and European ESPRIT programs: Software engineering is in contact with the design and manufacture of VLSI [Very Large-Scale Integration] circuits as well as the architecture of computers.

Products Please...Quickly!

A team of 300 researchers, soon to become 500, is working with the University of Texas in Austin on 4 major themes with objectives for 6 to 10 years: packaging and interconnection, software engineering, CAD and VLSI and advanced architectures (parallelism, futuristic data bases, knowledge-and artificial intelligence-based systems, human factors technology).

Each shareholding company takes part in at least one of the research projects. Nevertheless, the fact of participation in one of the research projects only confers a patent monopoly for 3 years. Beyond this period all transfers of technology are possible, because the guiding principle is to produce marketable products as soon as possible.

Finally, the Software Productivity Consortium may be mentioned, which, like MCC, brings together large private sector partners from the national defense industry. More commercial and more focused on applied research than Stars, this project can be compared with the CAM-i [Computer Aided Manufacturing-International, Inc.] organization which successfully promoted CAD and CAD/CAM techniques some time ago.

British Pragmatism

In the British Alvey program the same pragmatism may be found which induces private partners to associate with universities for precompetitive research while benefiting from hefty public aid, but the avowed goal is to develop operational products, not just theoretical ones. For this purpose, 65 million pounds sterling finance three closely correlated lines of study for 5 years:

-Innovation (with 27 percent of the funds) is to allow establishment of a base for the two other lines of R&D work in software engineering;
-Integration (with 43 percent of the funds) aims at introducing the methods and tools of the preceding phase [innovation] into workshops using more and more powerful software engineering;
-Exploitation, finally, devotes 30 percent of the funds to promote dissemination of these methods and tools in British industry.

France...in the Balkans

In France one has to accept the fact that a certain balkanization prevails in the diverse research programs.

After the centralizing effort of the computer plan in the days of strong Gaullism, the generosity of subsequent governments has been less. Financing has hardly exceeded Fr 150 to 200 million between 1979 and 1985, and it was spread out over a large number of so-called coordinating initiatives and organizations: PNGL received Fr 150 million of which Fr 75 million were public; SOL received Fr 60 million of which Fr 30 million were public, but had difficulties. Military funding was basically allotted through the General Delegation for Armament which only understands its own interests in LTR--which, of course, is at the heart of RITA [Integrated Automatic Transmission Network]! Other funds went to DIELI, to ADI [Data Processing Agency], to the Mission for Data Processing, etc.

The debates triggered concern among the French participants [in the Paris meeting] over the small scale of funding when compared with the huge public and private research investments in other Western countries (see table).

But the absence of real coordination within a truly national program creates above all the fear of ineffectivenes in whatever efforts are undertaken. In particular, certain interests refused to include in their budget the Fr 90 million which had already been spent by the Concerto project of CNET [National Center for Telecommunications Studies], which was considered uniquely of interest to the DGT [General Managment of Telecommunications]. It is true that much of it was already committed before the PTT [Post, Telegraph, Telephone] Ministry took control of the electronics sector.

As for the spin-offs from ESPRIT, they could be estimated optimistically at 15 to 20 percent of the program, i.e., some Fr 600 to 800 million.

The Tertiary Private Sector of ESPRIT

What is more, certain participants [in the Paris meeting] emphasized the domination of large electronics and telephone companies (Siemens, Thomson, CGE [General Electric Company], Plessey, etc.) in the guiding organizations of the European program. It is to their credit that they were at the origin of the initial political decision, but their data processing interests are quite specialized.

A Belgian academic wondered if it is reasonable to invest everything in luxury software which, though full of syntatic trees and formal grammars, is not likely to produce developmental workstations in the intermediate term at reasonable costs. Who can actually afford software engineering shops at Fr 250,000 to 400,000 per workstation. . .If these estimated costs can be maintained!

Nor was the standards issues ignored. But why belabor the delays of AFNOR [French Association for Standardization] due to lack of consensus when it is clear in fields still in their infancy, de factor standards, established by an intelligently constructed commercial success, will have more significance than any a priori theoretical agreement?

Hence the urgency of setting up real, preliminary coordination along Anglo-Saxon lines and looking at the needs of the marketplace.

Table. Size of sums committed to research during the 1985-1990 period.

Program	Country	Amount
Sigma	Japan	$100 million approximately Fr 800 million
Stars	United States	$250 million approximately Fr 2,000 million
Alvey	United Kingdom	65 million pounds sterling approximately Fr 700 million
ESPRIT	Europe	approximately Fr 4,000 million
PGNL + SOL + Military + etc.	France	approximately Fr 150 to 200 million

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COMPUTERS

LARGEST RESEARCH CENTER FOR EXPERT SYSTEMS IN NORDIC AREA

Stockholm SVENSKA DAGBLADET in Swedish 19 Jan 86 p 9

[Article by Torgny Hinnemo: "Nordic Research Councils Cooperating--Will Invest 100 Million in Computer Research"; first paragraph is SVENSKA DAGBLADET introduction]

[Text] The Nordic Research Councils will invest 100 million kronor in the largest unified Nordic industrial research project ever. The program involves computerized so-called knowledge-based systems.

The capability to develop knowledge-based systems is considered to be of great importance for the competitive ability of Swedish and other Nordic industries. Such systems, often called "expert systems," are expected to be a part of deliveries of complicated technical equipment in the future.

Questions and Supervision

Instead of a thick manual which the customer can have a difficult time finding his way through and understanding, an expert system will be delivered to which the user can ask his questions and get direct answers.

The expert system can also be used as a link in continuous supervision of, for example, process industries, or for equipment being exported.

In the recommendations put forward by Nordforsk, the agency for cordinating the research of the Nordic scientific engineering academies and technical research councils, they have proposed common development of larger systems for supervision of rotating machinery, intensive care in hospitals, risk analysis for insurance companies, communications between individuals and complicated computer systems.

Shared Costs

The costs, which will cover a five-year program, will be divided in accordance with a proposal that the Nordic Industrial Fund will contribute 25 million kronor, the industry 33 million and the National Research Council (Mainly Sweden and Finland) 42 million kronor. The Industrial Fund, however, will only be able to make grants for one year at a time.

The first comment from the Nordic Industrial Fund when the proposition first came from Nordforsk was that a request for such large amounts would surely be cause for discussions. It is, however, a priority area.

Even if the industrial fund cuts back on the request, the program will mean a strengthening of Sweden's research on the expert system, mostly by bringing academic research and industrial development closer together.

Over the short term Swedish business is primarily concentrating on gaining practical experience in the expert system and building up a cadre of technicians who can handle it.

Increasing Competence

There is a hope, however, not only among scientists, that Sweden will be able to develop increased competence within the technology behind the expert system.

American restrictions on the export of high technology include software for knowledge-based systems. Swedish firms may therefore have difficulty selling uncontroversial industrial equipment if it contains an expert system which is based on originally American software.

For further sales of completed expert systems there are also expensive license fees for the maker of the basic software.

Eight Million from STU

The National Board for Technical Development (STU) is at present investing an estimated eight million kronor per year in knowledge-based systems, mainly in the form of project grants to colleges. That is less than five percent of STU's total investment in the computer and electronics area. It is assumed that the level will remain unchanged in the coming year's budget also.

In addition to the STU investment, Swedish universities invest an estimated one million kroner per year in research on the expert systems.

The new Swedish Institute for Computer Science (SICS), which is now getting established at Kista in Stockholm, also has practical work with knowledge-based systems in its program.

Business Research

Some large Swedish firms are conducting their own research activities with the expert systems. In Linkoping a number of scientists formerly with the university there have formed their own company which will develop software for knowledge-based systems.

Also in other Nordic countries there is great interest in quickly building up competence in the expert systems. The Finnish organization for support for

research is now investing at least as much in knowledge-based systems as its Swedish counterpart STU.

The Finnish company Nokia is rapidly developing its capabilities since it became the Scandinavian representative for advanced Lisp machines, which are used in knowledge-based systems among other things.

The Norwegian oil industry is investing large amounts in the systems, which can supervise drilling equipment and analyze test results.

Denmark is taking part in an extensive expert system program for the EC countries, and Iceland is conducting its own experiments.

Sweden a Hub

Although Sweden is not ahead of the other Nordic countries, either in interest or in economic investment, there are many who advocate that Sweden should function as the hub in a Nordic research program.

The Universities of Linkoping and Uppsala not only have scientists with a high degree of competence within the area of artificial intelligence, but they have also worked with knowledge-based systems for so many years that they have established international reputations.

Since the beginning of the 80's both universities have four-year majors in computer technology, and they are beginning to turn out their first graduates to the labor market.

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COMPUTERS

COMPUTER INDUSTRY STANDARDS EFFORT IN EUROPE

Paris ELECTRONIQUE ACTUALITES in French 31 Jan 86 pp 1, 4

[Article by J.P. Della Mussia: "110 Circuits this Time Next Year: Philips and Texas Instruments Are Introducing a 150-MHz/24-mA CMOS Logic Family"]

[Excerpt] The four existing groups could be joined in the next few days by a fifth one, CNMA, consisting of about 10 European industrialists and manufacturers trying to set up a series of data-processing standards for the industrial environment.

The COS (Corporation for Open Systems) was just created officially following a meeting held in Washington on 23 January under the leadership of 17 U.S. manufacturers (see our issue dated 17 January).

These include such large companies as AT&T, Burroughs, Digital Equipment, Xerox, NCR or again Control Data.

They ended up by deciding to advocate communication standards corresponding to the ISO recommendations, and thus to effectively implement the connection of heterogeneous systems.

The association will have a total budget of $8-10 million per year; each member will contribute $125,000 already this year, and $200,000 per year subsequently.

As a Bull representative was to point out right after the meeting: "The COS is an important step toward worldwide unification of standards on the ISO model," all the more so as it reflects a new awareness on the part of U.S. manufacturers in the face of an anarchic situation which they feel played a large part in the crisis experienced last year by the American data-processing industry.

The COS may be the last link still required to open worldwide negotiations on these problems.

Its activity will complement that of manufacturers and users groups created in Europe and in the United States, from the SPAG (Standard Promotion and Application Group) which consists of 12 European hardware manufacturers, to

MAP (created on the initiative of General Motors to develop an industrial network) and TOP (dedicated to the development of an office automation network within a factory; the group was created by Boeing).

In addition, six Japanese manufacturers (Fujitsu, NEC, Toshiba, Mitsubishi and Oki) have decided to pool their efforts to achieve a similar goal.

The European counterpart of MAP, the CNMA (Communications Networking for Manufacturing Applications) should be created in the next few weeks and would thus complete the standardization front. It will be geared to the promotion of an industrial-type local area network, maybe just MAP.

It will have 20 members including manufacturers --Bull, GEC, Siemens, Nixdorf and Olivetti--and major users--BMW, British Aerospace and Peugeot.

The choice of the ISO headquarters in Geneva as a setting seems obvious, and meetings will thus take place there already next spring (including meetings with the Japanese).

However, all these groups are in constant touch with one another; European observers attended the Washington meeting (as did IBM observers) and, as is known, the important meeting held in December 1984 at the AFNOR headquarters in Paris on Bull's initiative was attended not only by SPAG members but also by some of the most prominent members of the present COS.

A number of initiatives reflecting the convergence of all these initiatives could be announced already this year.

That leaves one unknown: the attitude of IBM, faced with a front which, even though it denies it, is directed against IBM. Above all, these initiatives show to what extent the world of telecommunications and that of data processing have become one, increasingly challenging the de facto monopoly of IBM which now seems to be facing a sort of counter-power emanating from large users (an example of this is illustrated in our country by the implementation of the Scribe project). This state of things causes IBM to become more insistent in its plea for a real opening of the market, in particular by putting an end to the "preferential choice" system practiced by all administrations and public companies, which it says form a "controlled sector."

9294
CSO: 3698/312

COMPUTERS

BRIEFS

SAAB-SCANIA SUPERCOMPUTER--The Knut and Alice Wallenberg Foundation has set aside 10 million kronor for a future supercomputer for Swedish scientific and technological research. "With this, we will show that there is a need for such a supercomputer," says Professor Gunnar Hoppe, the foundation's executive member. Today, Swedish researchers have at their disposal a small part of the capacity of Saab-Scania's Cray-1 supercomputer. The agreement will expire in a couple of years. A survey is expected to present a proposal this spring on how the researchers are to be given access to another supercomputer. The Wallenberg Foundation, which has already supported researchers' share in Saab-Scania's supercomputer, has thus helped the arrangement along a bit with its appropriation. Of the 38 million kronor distributed at the foundation's last conference of the year, 3 million went to the state natural history museum. The money is intended for the omnitheater, which will be ready for the museum's 250th anniversary in 1989. In the omnitheater, 300 spectators will be able to sit in a sphere that at the same time functions as a movie screen. Inside the dome that surrounds the audience, films recorded with an extremely wide-angle "fish-eye" lens will be shown. The dome will also show projections from a computer-controlled planetarium projector. [Text] [Stockholm SVENSKA DAGBLADET in Swedish 29 Dec 85 p 8] 9909

CSO: 3698/274

MICROELECTRONICS

ITALY'S SGS BEGINS USE OF ORIGINAL FABRICATION METHOD

Paris ELECTRONIQUE ACTUALITES in French 31 Jan 86 p 14

[Article: "For 'Smart Power' Applications, SGS Is Industrializing a Vertical-Electron Complementary Bipolar Technology"]

[Text] SGS Microelettronica just started the industrialization of a vertical-electron complementary bipolar power technology based on an original manufacturing method for vertical-electron pnp-type transistors with insulated drains in an n-type buried well.

Actually, the manufacturing process used, called S^2P^2 (Super Signal Power Process), makes it possible to produce complementary vertical-electron npn-type and pnp-type transistors on a single chip.

According to the company, it can be used to produce at low cost practically any type of configuration, in particular "high-side driver" or full-bridge type circuits which until now required hybrid technology.

The first S^2P^2 technology circuit which SGS is about to sample should also be a driver of the first type for inductive loads, the L9350, essentially designed for the automotive market for engine control or fuel-pump regulation applications for instance.

The complementary vertical-electron technology developed by SGS offers a number of advantages over current techniques using lateral pnp-type transistors. In particular, it offers some gain on chip area, better voltage stability and improved control of the source-drain distance whose variations can have a considerable impact on transistor operation.

S^2P^2 technology devices can withstand transients of up to 120 V, and can thus be used without outer shields, for instance in automotive applications, thanks to the minimization of insulation diffusion in the n^+ epitaxial layer obtained through a two-stage manufacturing process.

The S^2P^2 process makes it possible to integrate four basic devices on a single chip: npn-type and pnp-type transistors, I^2L logic and linear circuits, and diodes with a low leakage current.

It is designed mainly for "smart power" applications which require pnp-type transistors.

High-Density Version

However, for lower-voltage applications (up to 60 V), SGS has developed a high-density version of the S^2P^2 process; it is called HS^2P^2 and makes it possible to integrate, on a single chip, 270 I^2L gates per mm^2, vertical-electron npn-type and pnp-type transistors and, diodes with a low leakage current.

The HS^2P^2 process is designed in particular for data-conversion and other applications running at up to 100 MHz. Thus, the Italian company is currently developing a low-voltage-drop regulator; a stepping motor driver and a read/write amplifier for hard-disk units.

9294
CSO: 3698/312

SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH-DANISH EUREKA PROJECT DETAILED

Paris L'USINE NOUVELLE in French 21 Nov 85 p 70

[Article by Helene Constanty: "French-Danish Application for Tomorrow's Membranes: Water Treatment"]

> [Text] The Lyonnaise des Eaux [Lyon Water Company], the world leader in water treatment, is collaborating with the Danish DDS (De Danske Sukkerfabrikker [Danish Sugar Factories]) on an R & D program in ultrafiltration and microfiltration membranes. This is one of the first 10 projects selected in Hannover as part of the EUREKA program.

The program linking the Lyonnaise des Eaux and its subsidiary Degremont with the Danish DDS, the leading producer of ultrafiltration membranes, is very ambitious. The two companies intend to spend Fr 300 million over 6 years on ultra- and microfiltration membranes and to advance rapidly to industrial applications. They have already started negotiations on the joint creation of a production unit for membranes of the new generation.

Some 20 researchers of the Lyonnaise des Eaux are already setting up their (membrane) laboratory in Toulouse, while DDS has assigned about 25 people to the program. The two companies are also linked to outside research centers: CNRS [National Center for Scientific Research], IRCHA [National Institute for Applied Chemical Research] in France, and the Imperial College in London, in addition to DDS.

Today the membranes are mainly utilized in the milk industry and in biochemistry and so far have only very limited applications in water-related jobs: desalination of sea water by reverse osmosis and production of ultra-pure water for laboratories. But, according to Francois Fiessinger, director of the Lyonnaise-Degremont research, the potential market is huge: "Half the world's water treatment market will be involved within 10 years, i.e., approximately Fr 10 billion.

The figure can be multiplied by two, given the evolution of membrane use in the agro-food industry. The stakes? A veritable revolution in water treatment techniques--water quality improvement and cost reduction: The

advantages of the membranes are commensurate with the large expenditures the two companies are prepared to dedicate to the research program.

The health quality aspect should not be overlooked. By eliminating bacteria and viruses, the membranes make addition of chemicals or disinfectants like chlorine or bleach unnecessary. Another asset is that they will permit reduction of installation size to one-quarter, which should contribute to a marked cost reduction, based simply on the price of land in urban zones.

The first drinking water installation built using the new technology should come into being 3 years from now. This is the first stage aimed at by project officials. The treatment of waste water will be the second: According to Francois Fiessinger, "membranes are the key to high-performance biological reactors." Their development therefore is the beginning of a new generation of purification techniques, and is of interest to the entire fermentation industry (pharmaceuticals, agro-foods).

This is why the alliance with the Danes is important. With an 8-billion-kroner turnover, DDS constitutes in fact one of the most powerful industrial groups in Denmark, active in two main areas: the sugar industry ad agro-food engineering.

DDS has been producing ultrafiltration membranes since 1970 (its Nakskov plant employs 200 people) and sells them mainly within turnkey factories for the milk, biochemical, or paper industries. "We control 15 to 20 percent of the world's membrane market," points out Rud S. Madsen, director of research. "More than 90 percent of our production is exported to the United States and the industrialized countries."

The motivations behind the Lyonnaise des Eaux-DDS alliance are obvious: The Danes bring their expertise in the industrial production of membranes and their influence in the agro-food industry, the French their position as leader in the water area.

The two companies did not, of course, wait for EUREKA to start research on membranes: "We dedicated a large part of the 300 million kroner invested this year in research and development by the group to this," indicated Rud Madsen. Membranes also occupy a choice place in the FR 82 million R & D budget for the French group's waste-water project in 1985.

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SCIENTIFIC AND INDUSTRIAL POLICY

NIXDORF VP KLAUS LUFT ON STRATEGY, EUREKA, AI

Paris ZERO UN INFORMATIQUE HEBDO in French 9 Dec 85 pp 16, 17

[Interview with Klaus Luft, vice president of Nixdorf AG, conducted by Nicolas Rousseaux in Paderborn, FRG, date not given: "Teamwork Is the Important Thing'; first paragraph is ZERO UN INFORMATIQUE HEBDO introduction]

[Text] His body is square like a quarterback's; his head is round like the barrels found in Westphalia; he speaks clearly and his eyes are calm. This is the portrait of Klaus Luft, 43, vice president of Nixdorf. He joined the German manufacturer in 1967.

He set up the Munich branch, and, in 1969, he was put in charge of sales and marketing for Germany and Austria. In 1974, his field of action extended over all subsidiaries of the group. Four years later he became vice president but kept the same operational position. Since 1980 his functions have also included finance and administration, and 10 months ago, the product department was added to the list.

He started his career in 1964 at Kienzle, a Mannesmann subsidiary, which used electronic equipment made by Nixdorf (this is the link).

He receives us in Paderborn, between Hanover and Dueseldorf, in shirt sleeves, in a small work room in the company's head office.

In this interview, Klaus Luft talks about social policy in Japan, Nixdorf's position with regard to its close competitors, Europe's future, the "entente cordiale" with IBM, Nixdorf's history and strategy, and also about the succession of the founding father.

01 HEBDO: Last year we learned that you, Klaus Luft, will succeed Heinz Nixdorf. How do you feel about being the successor to such a personality?

Luft: To be honest, I have never thought about that.

01 HEBDO: Never?

Luft: It is more a matter of ensuring the leadership continuity of a company. It is clear that Mr Nixdorf does have a certain personality. One cannot succeed a personality. Everybody had his own. There is no doubt about that and I think the real question is the continuity of leadership. However, you will be seeing Mr Nixdorf for a long time to come. As a matter of fact, we work as a team; this is very important to our company.

01 HEBDO: Could you give us a few examples?

Luft: In a great number of areas, decisions are never made here by one single person. For example, Mr Nixdorf has given us great freedom in the sales and marketing sectors. As another example, product definition is the work of several persons. From the very beginning the teamwork approach was adopted. Many people make the mistake of thinking that a company such as this one, under the leadership of such a man, is a one man company. One of his great strengths is to trust younger people, to give them an opportunity to prove themselves and to have access to responsible positions in the company.

01 HEBDO: Are these the best examples you can give?

Luft: Absolutely, yes, they are, as far as the sales, marketing, and product departments are concerned.

01 HEBDO: What is your position on projects such as EUREKA [European Research Coordination Agency]? Do you believe in the Europe of new technologies? You participate in the "Open Group for Unix System" and in one of the 172 ESPRIT [European Strategic Program for R&D in Information Technologies] projects. Aren't these the only European projects to which you have subscribed?

France Is on the Right Track

Luft: Our primary goal is to be an international company, meaning Euroupean. We take part in the OSI [not further identified] project as well, also a European project. In fact, we rather favor a EUREKA style approach because it reaches farther. We think Europe is a good base for future development-oriented high technologies. A few weeks ago, I attended a meeting with Hubert Curien and our minister of research to talk about Eureka. At that time, I agreed more with the French position than that of our own representatives. I found the French were more future oriented.

01 HEBDO: How do you explain this?

Luft: The French were talking about EUREKA's goals while the Germans remained very formal. They kept talking about the budget. I really felt the German officials were to reticent. This was not the right time to discuss the budget. Europe does have good starting bases. They must be brought to a better level and further efforts must be made.

Artificial Intelligence Is a Must?

A program such as EUREKA can contribute to this. It deals not only with computers, but also with industrial applications such as biotechnologies, rail transport networks, and new production technologies.

01 HEBDO: With which companies would you like to cooperate?

Luft: You mean in Europe?

01 HEBDO: Yes.

Luft: There are, for example, some French telecommunications companies such as CGE [General Electricity Company] or software companies with which we are already working. There are also applications such as expert systems and artificial intelligence which should be mandatory for Europe.

One of the reasons Japan is concentrating so heavily on artificial intelligence is that they know perfectly well that expert systems will bring progress for all industries, not only for the computer industry, but also for the business world as a whole, making it more competitive. This type of application must become one of Europe's primary goals.

"The Touchstone of IBM's Success And Ours"

01 HEBDO: You have the habit of never returning the profits of your subsidiaries to the head office. Will this challenge affect your relationship with your European subsidiaries?

Luft: This is not essential. To remain competitive with companies such as IBM, you need to have a clearly defined and appropriate market structure. This is the touchstone of IBM's success and of our success. It is not my intention to suggest that we have different, intricate marketing policies, one for each country. Yet it is possible to have a company with a European slant in research and development and in manufacturing. But the sales and services efforts must be dedicated to a specific market.

01 HEBDO: You mention IBM. Nixdorf is the largest European manufacturer operating the United States. Would Nixdorf-USA be interested in being introduced on the New York Stock Exchange?

Luft: We could do this, certainly. But during the last 2 or 3 years, the European financial market has proved that it is possible to refinance through the European financial market. This is a major and very positive change for Europe. We talked about EUREKA, but that is not all. Now we have venture capital and a stock marekt in far better condition that it used to be. All the factors leading to new industrial thought are there. Therefore, there is no need for a European company to go public in the United States. In my opinion and for our type of industry, Frankfurt is in better condition than New York at this moment.

01 HEBDO: Do you intend to associate with a particular computer manufacturer? Does this type of action have a place in your long-term strategy?

Luft: No.

01 HEBDO: Not at all?

Luft: I would not say, "Not at all." Our strategy must be developed in comparison with other companies of our size. We do not want to pressurize a smaller company with our decisions. The only groups of people we want to depend upon are clients and users, not companies. There is a lot of talk about the moves around IBM and AT&T at the moment in the United States. However, there is still room for the other companies in this sector. Digital is a good example of that. Besides, AT&T must still prove it belongs in this business. OK? And the same goes for IBM in the telecommunications business.

Too many people think a company's success is a given. Too few people think about the fact that a company must earn its income one day at a time. Nothing is ever granted in advance. And that is the problem. Of course, IBM is very powerful and has large shares of the market, but that does not mean that IBM never makes mistakes.

01 HEBDO: Is it the available markets you were talking about that make you optimistic about the growth of your company?

Luft: The key question today is to keep in close contact with the client. This is the major point. If you look back at what the press wrote 3 or 4 years ago, many people thought mergers between companies were the only solution for the problem of capital. Of course, we need capital to grow, but we chose the public financial market. Therefore, I think that the key question for a company like ours is to know how to keep in touch with the users, how to have a solid financial basis.

The most important factor is to have personnel really devoted to our clients, creative people, in other words, "to support." The true capital is the people. Many people invest in factories. But the question today is to learn how to transfer the technologies to make the system work. Many people write articles about the production of microprocessors.

Microprocessors are popular because you can show their small size, etc. But today's chips are nothing but yesterday's electric engines. The problem lies in knowing how these tools will be used.

01 HEBDO: You have a project to build a microprocessor manufacturing plant in the FRG. You are also working on fault tolerance systems. Should this be seen in the context of your philosophy of "autonomy"?

Luft: There are two answers. The microprocessors should allow us to increase production speed even though we remain dependent. Thus, we would not have to

wait months but weeks for new chips. We have already improved this cycle by installing a satellite connection with California. The fault tolerance system is something else.

We believe that offices and companies are becoming increasingly dependent upon the availability of computer systems. They are the ones asking for fault tolerance systems. They want a system that is available 24 hours a day. Our objective is to give them something they can hold on to. In this business you depend on sales people. There is no doubt about that. Even IBM is more dependent on them that it ever was.

"We Had To Set Up Our Own Sales Structure"

01 HEBDO: One of the primary sales goals of Nixdorf is selling to banks. Why?

Luft: From the very beginning of Nixdorf, the first clients were banks. A key man in the company, who died a few years ago, is the one who really led us into this market. He worked with Mr Nixdorf.

01 HEBDO: What was his name?

Luft: Pringea. He worked with Bull as well. He was head of Bull's sales department in Germany for a long time. He pushed his machines towards the banking sector. He left Bull when he saw the new developments we were making at the time on a small system, something like a PC inside a desk. He told us this would make a very good terminal for banks. He also taught us how to talk to bankers. He trained our employees for this application. This was in the middle of the sixties.

There was another very important decision around that same period. We decided to compete with IBM in certain markets. We had to develop our own sales network dedicated to a specific market. The big clients actually like to talk to the sales people directly. We added the necessary financial instruments which permitted renting or leasing of the equipment. This was also IBM';s policy. This is what allowed us to be competitive and to gain our share of the market.

01 HEBDO: Can you explain why Nixdorf and its subsidiaries prefer constructing their own buildings rather than renting them?

Luft: If you take a look at our structure, you will see that the product is as important as the service. We own our own plants. Why not own our aftersales service offices? This is not that far removed from our philosophy. There are many towns, regions, and countries which like to show a Nixdorf building to the public. Many offer us land at below market prices. Also, we practice long-term thinking. Finally, the third reason is the relationship of trust between the client and ourselves which is why we invest in their territory.

The Legend of the Motorcycle

01 HEBDO: Legend tells us that Heinz Nixdorf started his career by jumping on his motorcycle one day to go to France and sell a computer he had built. There are many young people like him who try this adventure. Many of them fail. How do you explain Heinz Nixdorf's success?

Luft: He had a very clear idea of how to make a product. Take his first product, the way he structured it: not complicated and already oriented towards quality. He used standard vacuum tubes. In data processing, you only need yes and no. For radios, you need frequencies. He believed that for data processing only a low energy consumption was required, so he worked on the service life of his calculator. The service life of the tubes depends on the power consumption. Therefore, it was more interesting for him to design a clear and simple structure rather than a complex one.

Moreover, he has always been a solid business man. There are few engineers who possess both qualities. From the very beginning he was very concerned about the exact needs of the consumers and he wanted to be responsive to them. Finally, his imagination allows him to transform technological developments into products of the future. Often an entrepreneur will have the initial idea, but not the second or third idea which must follow. For example, the study of a particular application, he will first inquire about the price evolution of semiconductors for the next 4 years before suggesting any decision.

01 HEBDO: What makes Nixdorf different from its closest competitors: ICL, Olivetti, Bull, and Siemens?

You Have To Lear To Live With IBM

Luft: There are several orientations: the international market, for example. Even though Siemens is internationally oriented, its computer sites are not. This is also true for Bull and ICL. They focus too much on their own countries, and not enough on the international market. ICL's profits come from the United Kingdom, South Africa, Australia, etc., typical British markets. For Bull, the markets are shared with Honeywell, even in Europe. Bull has a turnover of some DM 300 million in Germany.

That is not enough! Another orientation is the segmentation of the markets, banks, distribution, small- and medium-sized businesses, etc. It is impossible to gain a strong position in a particular market without cultivating expertise in that market. Investments can only be made segment by segment. This is not the case for Siemens, but it is for ICL and Bull. We have always seen IBM as a competitor but also as a company with which we have to live.

ICL and Bull were not too fond of connections with IBM and in the end they have suffered from that policy. Now, if you compare us with Olivetti, their field is typewriters and they are good at it. They are not in the same markets as we are.

01 HEBDO: You have had a subsidiary in Japan for a long time, have you not?

Luft: Yes, we started with a partnership formula there back in 1970.

01 HEBDO: You are developing your microcomputer together with Matsushita. Do you forsee an extension of this cooperation to other Japanese companies?

Luft: This might be possible for certain specific fields.

01 HEBDO: Which ones?

Luft: The Japanese are good on IBM compatibility. That is one example. They are also good in consumer products and this had its impact on the PC market. I think these are probably the only two examples, together with the peripherals. Recently, we opened an IBM workstation to see what was inside. A lot of elements were from Matsushita!

01 HEBDO: You have the reputation of having a rather positive social policy. What is your opinion on Japanese-style management? Do you think it is a good example for you?

Luft: That depends. Undoubtedly, this type of management is successful in Japan. But you really have to get inside the mechanisms of the system, understand it, to find out what can be done in Europe. The way of thinking is different. Nor can you say that there is only one social system in Japan. There is the security of the large companies, and there is also a very flexible system applied to the female workforce.

Nippon-Style Management?

Do you know the word used by the Japanese to distinguish female workers from male workers? "Arbeiter!" They have used this German word since the times when German workers had very few rights. If a Japanese female worker does not earn more than DM 8,000 per year, the company does not have to pay taxes or social security. She can be fired on a daily basis and reemployed the next day. It is really a flexible system! I have seen plants with 10 to 15 engineers with a normal contract, whereas all the others were subject to this flexibility. It is not easy to characterize social policy in Japan.

Also, you have to consider small- and medium-sized businesses: They have no social organization whatsoever. The sales people who work for big companies selling microcomputers, for example, have no union and they work 12, 15, or 20 hours on each client. The main strength of Japanese industry is its ability to make quality products at low prices, not creativity or innovation. That is the way they do things. Once they have made up their mind about what do do, they will do it with 110 percent efficiency. One can learn a lot from Japan, but the social systems are very different.

01 HEBDO: If somebody asks you for a job, what is your answer?

Luft: I will try to determine his personality. I concentrate on factors which are independent of knowledge and experiences: a sense of realism, the ability to adapt, etc. What is his creative approach; what are his leadership qualities? All our projects depend on teamwork. Then I will look at his knowledge of foreign languages, his interests. Above all, we want to engaged personalities.

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TECHNOLOGY TRANSFER

SWEDISH COMPUTER FIRM AFFECTED BY HIGH TECH EMBARGOES

Stockholm DAGENS NYHETER in Swedish 13 Jan 86 p 7

[Article by Bo G. Andersson: "Accused Now of Embargo Violation"]

[Text] "We must surrender to the American world police!"

This conclusion is drawn by computer businessman Bengt E. Andersson. He risks being locked out of the computer industry. Most recently, he has been subjected to an intensive investigation by the U.S. embassy in Stockholm.

Bengt E. Andersson is only one of a number of Swedish computer businessmen who have been caught by the long arm of American export control. But he is unique so far in being the only one who has been accused by the United States of violating the embargo without at the same time being suspected of violating Swedish laws.

During the last few months, he has been questioned several times by the special export control attache at the embassy. The U.S. Customs Service has furthermore sent a representative to Stockholm to inspect one of his computers here.

This arrogant investigation on Swedish soil has made Bengt E. Andersson reconsider his opinion of Swedish neutrality.

"Previously I was convinced that we, as a neutral state, could trade with both East and West as long as we followed Swedish law.

"But are we really neutral if we sell civilian computers to the East when we know what the American embargo regulations are like, and how hard the United States is trying to stop all so-called technology transfer to the Eastern bloc?" he asks.

House Search

All of this began on the morning of 5 September 1985, when the customs police searched his home and his office in central Stockholm.

The customs suspected that goods were being smuggled. The reason was that they had received information from their West German colleagues, who were investigating an embargo violation at a computer firm in Essen.

"The firm in Essen has been a customer of mine since 1980. For the last three years, I have also acted as an intermediary in 20 shipments of used IBM computers from Essen via Sweden to East Germany," he says.

West Germany, which in contrast to Sweden has special embargo laws, suspects that the IBM shipments through Sweden and Bengt E. Andersson involved a ciucumvention of the U.S. technological embargo against the Eastern bloc.

A month after the customs raid, he received a telex from the American embassy on Strandvag. It said that the U.S. Department of Commerce wanted to get in touch with him as soon as possible for an interview. "We must answer Washington... regarding your cooperation and your attitude, in order to avoid your being subjected to any incorrect trade sanction," the telex continued.

For 25 years, Bengt E. Andersson has had his own firm in the computer industry. He imports and exports large used computers, and has specialized in American IBM products. The computers have been 5 to 10 years old, and the customers have been located throughout all of Europe, including the Eastern bloc.

"I have made a blunder -- on the moral level," he says. "And it was in 1982 when I wrote on a piece of paper that I certified that my firm would not reexport the computers that I imported from the Essen firm."

Regrets the Certificate

"I was dealing with an old customer, and I gave in to instructions from the owner of the West German firm."

The certificate with Andersson's signature is now the Americans' trump card. It was used by the Essen firm to make it appear to the United States that the transactions involving the IBM computers had taken place between West Germany and Sweden. Actually, all of the computers ended up in East Berlin, in contravention of the U.S. embargo.

"I got branded, however, I have not broken any Swedish laws," he says without bitterness.

"I regret the certificate, however. I understand now for the first time the kind of consequences that it can have, not just for myself, but also for Sweden's credibility overall as a country purchasing U.S. high technology."

Bengt E. Andersson is no longer suspected by Swedish customs of having smuggled IBM computers to East Germany.

More Regulations Needed

His decision to step forward so openly here is due to his desire to make a contribution to the debate over Sweden's great dependence upon the United States in regard to high technology. He thinks that it is high time for the government to react and introduce some kind of regulatory mechanism to supplement the war materiel legislation.

"Today I am fully convinced that we must regulate all technological trade, even if it is completely civilian.

"One should be able to have a time limit for exports. Computer equipment older than 7 years is usually harmless, and should be exported freely, while newer computers could require an export permit."

During October, Swedish customs stopped one of his IBM computers when it was on its way via Sweden to East Germany. Several days later, he received another message from the U.S. embassy. The tone was harsher now, and export control attache Brooks D. Ohlson stated bluntly that "the American government must control how you dispose of and handle the computer if it is returned to you."

Can Be Punished

In December, Bengt E. Andersson sent the computer back to West Germany at his own expense. "I did not want to provoke the Americans and keep the computer, which per se I had a complete right to do," he told DAGENS NYHETER.

Now he is waiting for an answer from the Department of Commerce in Washington about the result of the inquiry into the suspected violation of the embargo. He expects, however, to end up on the U.S. "blacklist" of people who have violated the embargo.

"That means that my firm is finished in the business. No other firm is going to be able to cooperate with me. They would run the risk themselves of being locked out of the U.S. market and even 'punished' in another way."

Sweden's problem as a technologically dependent and neutral country in between the superpowers, the United States and the USSR, came to a head in the case of Bengt E. Andersson.

Sweden's increasingly exposed position between the superpowers is going to be brought up in a number of articles. We have spoken with industry, customs, and peace and conflict researchers, among others.

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